

Joint Fire Science Exchange Network *2014 Evaluation Report*

*A National Cluster Evaluation of the
Fire Science Exchange Network's
Processes and Impacts*

**University of Nevada Cooperative Extension
University of Nevada, Reno**

Funded by a grant from the Joint Fire Science Program



University of Nevada
Cooperative Extension



The University of Nevada, Reno is committed to Equal Employment Opportunity/Affirmative Action in recruitment of its students and employees and does not discriminate on the basis of race, color, religion, sex, age, creed, national origin, veteran status, physical or mental disability, and sexual orientation. The University of Nevada employs only United States citizens and aliens lawfully authorized to work in the United States.

Copyright © 2014 University of Nevada Cooperative Extension



University of Nevada
Cooperative Extension

Joint Fire Science Program Fire Science Exchange Network 2014 Evaluation Report

**Lorie Sicafuse, UNR Dept. of Ed. Psychology, Doctoral Candidate,
Interdisciplinary Social Psychology Researcher
Lisa Maletsky, UNR Dept. of Ed. Psychology, Doctoral Student,
Interdisciplinary Social Psychology Researcher
William Evans, Professor, State Extension Specialist
Loretta Singletary, Professor and
Interdisciplinary Outreach Liaison**

A partnership of Nevada counties; University of Nevada, Reno; and U.S. Department of Agriculture

Table of Contents

Executive Summary	5
2014 Online Survey Results	5
Trend Analyses	6
Webmetrics Results	8
Implications.....	8
Introduction	10
Online Survey Component	11
Method	12
Participants	12
Consumer Survey Results	15
Consumer Demographics.....	15
Experiences with Fire Science Information and Information Producers.....	17
Items Regarding Fire Science Exchange Efforts	19
Evaluation of Fire Science Exchange Websites.....	20
Quantitative Consumer Responses	21
Qualitative Consumer Responses: Additional Survey Responses Concerning Exchange Websites	22
Experiences with Fire Science Information Communication Sources	25
Consumer Perceptions of Obstacles to Accessing and Applying Fire Science Information	28
Producer Survey Results	29
Producer Demographics	29
Producers Research Practices and Experiences with Consumers	31
Items Regarding Fire Science Exchange Efforts	33
Perceptions of Fire Science Exchange Websites.....	34
Producer Perceptions of Obstacles to Fire Science Information Dissemination and Application	35
General Public Survey Results	37
General Public Demographics.....	37
General Public Experiences with Fire Science Information	39
General Public Experiences with Fire Science Information Communication Sources.....	40
Trends across Survey Years	43

Consumer Trends	43
Experiences with Fire Science Information	43
Perceptions and Experiences Regarding Fire Science Information Producers	44
Opinions and Experiences Regarding Fire Science Exchanges	46
Producer Trends	51
Producers’ Research Practices and Experiences with Consumers	51
Opinions and Experiences Regarding Fire Science Exchanges	53
General Public Trends	58
Experiences and Opinions Regarding Fire Science Information and Management Issues ...	58
Online Survey Component: Summary and Implications	61
Consumer Perspectives.....	61
Producer Perspectives	62
General Public	63
Webmetrics Component	65
Quantitative Webmetrics Component	65
Basic Website User Data.....	66
Visitor Loyalty	68
Traffic Sources	70
Top Website Content.....	71
Qualitative Webmetrics Component	73
Fire Science Exchange Websites.....	74
Website Evaluation Plans	78
Social Media.....	80
Webmetrics Component: Summary and Future Directions	86
Limitations	88
References	89

Executive Summary

The National Evaluation of the Joint Fire Science Program (JFSP) aims to assess the processes and outcomes of regional Fire Science Exchanges (Exchanges) and Exchanges' programming at the aggregate national level. This ongoing evaluation includes four components: an online survey, targeting the fire science information-related experiences and opinions of fire managers/practitioners (Consumers), fire researchers/scientists (Producers), and members of the General Public; a webmetrics component including quantitative and qualitative elements; an evaluation resource guide designed to assist Exchanges in evaluating their regional activities; and a qualitative interview component exploring the perspectives and experiences of key Exchanges' personnel. The current report presents results obtained from the **fourth wave (Wave 4)** of data collection from the online survey and webmetrics evaluation components. In addition, it provides the results of descriptive analyses comparing mean survey responses across waves, which help illustrate the Exchanges' progress toward their shared goals.

Six JFSP Exchanges participated in the online survey this year, actively recruiting participants between March 2014 and July 2014. A total of **528** individuals participated. Most participants were Consumers (68.0 percent) followed by Producers (21.8 percent) and members of the General Public (7.3 percent). The number of Wave 4 survey participants was substantially lower than the number of participants in Waves 1 and 2, but higher than the number of participants in Wave 3. Exchanges should continue to expand their listserves to address survey fatigue and help increase response rates in future waves.

It should be noted that more detailed summaries of findings and implications of the online survey, which incorporate both the most current survey responses and trend analyses across waves, are included in this report. These summaries begin on p. 43 (for Consumers), p. 51 (for Producers) and p. 58 (for the General Public).

2014 Online Survey Results

As in prior years, results from Wave 4 of the online survey were quite positive, with the majority of respondents to all three survey frames (Consumer, Producer and General Public) reporting positive opinions and experiences regarding fire science information. The following findings were particularly noteworthy:

- ◆ The majority of both **Consumers** and **Producers** had very favorable perceptions of their Exchange's impacts on fire science delivery. They were particularly likely to agree or strongly agree that their Exchange has helped improve both the accessibility and the application of fire science in their region.
- ◆ Most **Consumers** agreed that they often draw on fire science research when making work-related decisions, suggesting behavioral change and a movement toward medium-term outcomes of Exchanges' programming.

- ◆ The majority of both **Consumers** and **Producers** reported positive experiences with their Exchange’s website, indicating that the sites were user-friendly and provided a wide variety of current fire science information that was relevant to their role as either managers or researchers.
- ◆ Overall, both **Consumers** and **Producers** had positive attitudes toward one another. Producers, however, viewed themselves as more approachable than Consumers perceived them to be. Both Consumers and Producers expressed a desire to work with one another, but this desire was more strongly expressed among Producers.
- ◆ Both **Consumers** and **Producers** identified a lack of communication *between* agencies and organizations and a lack of communication *within* agencies as the top two obstacles to accessing and applying fire science information in their region.
- ◆ **General Public** respondents expressed a very strong interest in learning more about fire science/management issues; they also were concerned about the effects of fire on their community and the environment.
- ◆ The majority of **General Public** respondents agreed or strongly agreed that their awareness of fire science/management issues had increased during the past year.
- ◆ **General Public** respondents cited interactive/in-person learning opportunities as the most useful sources of fire science information.

Trend Analyses

Mean responses to survey items were compared across all four waves to identify trends in participants’ perspectives on fire science information and information delivery. Exchange participation in the survey varied across years, and the participating Exchanges were often in different phases of development. Yet, since all Exchanges have been established for at least three years, comparing mean responses across survey waves can help illuminate progress toward shared goals at the aggregate level. Notable trends emerging from these comparisons are highlighted below.

Consumer Trends across Survey Waves

Over time, Consumer respondents were increasingly likely to agree that:

- ◆ Fire science information is easy to find.
- ◆ During the past year, I have changed at least one thing in my work based on what I’ve learned about fire science.
- ◆ Fire science information is easy to apply to my specific problems.
- ◆ The Exchange has helped improve the accessibility of fire science information.

Consumer Trends across Survey Waves Continued

Over time, Consumer respondents were increasingly likely to agree that:

- ◆ The Exchange has helped improve the use and application of fire science.
- ◆ My exchange's website provides practical information I can use in my job.

Other notable findings:

- ◆ Consumers were more likely to report using information they obtained from their Exchange's website on the job *Often* or *Very often* in 2014 than in 2012-2013.
- ◆ Over time, Consumers were less likely to agree that lack of fire science information availability in one place was an obstacle to accessing and applying fire science information in their region.

Producer Trends across Survey Waves

Over time, Consumer respondents were increasingly likely to agree that:

- ◆ The Exchange has helped improve the accessibility of fire science information.
- ◆ The Exchange has helped improve the use and application of fire science information.
- ◆ My Exchange's website keeps me informed of current research findings.

Other notable trends:

- ◆ Like Consumers, Producers were more likely to report using information they obtained from their Exchange's website on the job *Often* or *Very often* in 2014 than in 2012-2013.
- ◆ Over time, Producers were less likely to agree that lack of fire science information availability in one place was an obstacle to accessing and applying fire science information in their region.

General Public Trends across Survey Waves

Over time, General Public respondents were increasingly likely to agree that:

- ◆ My awareness of fire science/management issues has increased during the past year.
- ◆ I am interested in learning more about fire science/management issues.
- ◆ I am concerned about fire danger in my community.
- ◆ I am concerned about the effects of fire on my environment.

Webmetrics Results

The webmetrics component of the national evaluation includes two elements. The quantitative component assesses the impacts of Exchange websites in terms of visitor recruitment and retention, the extent to which users engage with the websites, and the performance of specific website features or pages. The qualitative component examines the operation of the Exchange websites and social media accounts in more detail and solicits feedback from Exchange representatives regarding website and social media-related purpose, target audiences, and challenges. Key findings from both elements are highlighted below:

- ◆ There was an increase in the overall number of both unique and repeat visitors to Exchange websites between Wave 3 and Wave 4.
- ◆ In prior waves, most users accessed Exchange websites directly. In Wave 4, *Organic* access (access through search engines), became the most common traffic source for Exchange websites.
- ◆ The most frequently visited page types across Exchanges were 1) Events and webinar pages; 2) Maps and tool pages and 3) Publications and research pages. Publications and research pages were notably less popular than the top two page types.
- ◆ Only four Exchanges reported conducting a regional-level evaluation of their website, with an additional four reporting plans to do so in the future.
- ◆ Thirteen of the fourteen Exchanges reported maintaining social media accounts. More than half ($n = 8$) of these Exchanges indicated that these accounts were updated daily or several times per day. Exchanges should continue to link social media accounts together and with their websites.
- ◆ Many Exchange representatives believed that their social media accounts were important means of increasing Exchange membership and awareness of fire science issues, information, and tools. Other representatives, however, expressed concerns about the potential for social media to reach their target audiences and about the time required to continually update their accounts.

Implications

Findings from Wave 4 of the national evaluation indicate that the Exchanges have made significant progress toward their shared goals. Online survey results suggest that the Exchange efforts have improved the accessibility of fire science information and tools. Findings also indicate that Exchanges are helping to improve the relevancy of the fire science information disseminated for both Consumer and Producer audiences. Most importantly, it appears that Exchange efforts have led to changes in behaviors and decision-making, as Consumers were increasingly likely to report applying what they have learned about fire science on the job.

Effecting change is a long-term process, and Wave 4 findings did illuminate some potential focus areas for the Exchanges. Although the application of fire science information has increased, some Consumers as well as members of the General Public continued to report difficulties in applying the knowledge they have acquired. Many survey respondents also believed that a lack of communication both within and between agencies impeded fire science information access and application. Exchanges may consider focusing on improving such communication because *Communicating with co-workers* has consistently been cited as Consumers' most preferred source of fire science information. Both Consumers and the General Public strongly prefer interactive learning opportunities. These audiences may not have frequent opportunities to participate in such events but it is important for the Exchanges to continue to sponsor as many of these events as possible. These events could incorporate components designed to train and encourage attendees to share what they have learned with their colleagues.

Wave 4 results indicated that the time and resources Exchanges have expended on their websites have been worthwhile. The Exchanges continued to attract new website visitors and retain loyal users. Users are increasingly arriving at the sites via search engines, which suggest an increase in the websites' electronic importance as well as successful outreach to new users. Across survey waves, both Consumers and Producers were increasingly likely to report using information obtained from their Exchange's website.

Exchange representatives continued to report challenges regarding the time and effort required to maintain and update their websites. This is a valid concern, as few Exchanges have dedicated webmasters; most rely on the PI or Coordinator for website maintenance. The implementation of the website template among many Exchanges should help ease this burden. Also, the adoption of the website template should allow the national evaluation team to explore Exchange website impacts in more detail, particularly with regard to assessing top website content.

Findings from the national evaluation are intended to assess Exchange progress and obstacles concerning their shared goals at the aggregate level. As each Exchange is unique, it remains critical for Exchanges to evaluate their processes and impacts at the regional level. Several Exchanges have been engaged in regional evaluation activities designed to assess the impacts of their programming and their constituents' fire science information needs. Exchanges should continue to assess participant needs and perspectives while focusing on medium-term outcomes of their programming, which are evidenced by changes in constituents' behaviors and decision-making. It is also important for Exchanges to evaluate their websites at the regional level, especially considering new requirements that federally funded entities track and report data pertaining to websites and social media accounts. The national evaluation team is available to provide technical assistance to guide the Exchanges in these regional evaluation endeavors.

Introduction

During the past several years, there has been an increasing emphasis on federally funded program accountability. Programs must clearly demonstrate the impacts of their efforts in order to secure future funding and support. This is often best accomplished through theory-driven evaluations examining multiple facets of program activities and outcomes. To this end, the national cluster evaluation of the Joint Fire Science Program (JFSP) Fire Science Exchange Network (Exchanges) employs a mixed-method approach grounded in the Logic Model to assess the processes and outcomes of activities. Because each Exchange is diverse and in varying stages of development, the present evaluation is conducted at the aggregate level to track progress toward Exchanges' shared goals related to the enhancement of fire science delivery. Results are intended to: 1) assist the JFSP Board in determining how to improve and further support Exchanges' performance and success; 2) provide feedback to Exchanges concerning progress toward their goals to help maximize the impacts of outreach and educational activities; and 3) facilitate Exchanges' development of JFSP best practices toward reaching shared goals.

The national cluster evaluation of the JFSP Exchanges contains four components:

1. An online survey targeting fire managers/practitioners, fire researchers/scientists, and members of the general public;
2. A webmetrics piece including both quantitative and qualitative data to evaluate the Exchanges' websites;
3. An evaluation resource guide to help Exchanges build capacity to conduct regional-scale evaluations; and
4. Interviews conducted with Exchange personnel to capture the successes and challenges encountered in increasing the accessibility and applicability of fire science information.

Findings from the qualitative interview component were presented in a separate report distributed in summer 2013. This report focuses on the findings from the **fourth wave (Wave 4)** spring 2014 online survey and webmetrics components of the evaluation of the JFSP Exchange Network.

The report begins with an overview of the online survey evaluation of the Exchanges, which focuses primarily on respondents' perceptions and behaviors regarding fire science information accessibility and applicability. Findings from the spring 2014 survey are presented, followed by means from the survey Waves 1-4. Next, this report summarizes results obtained from the qualitative and quantitative webmetrics components of the JFSP evaluation. Implications of both online survey and webmetrics findings are explored in respective summary sections.

This report differs from reports in prior years as 14 JFSP of the currently funded 15 Exchanges participated in both the online survey and webmetrics evaluations. Whereas the national evaluation still seeks to enhance the understanding of participants' most current perspectives on fire science information accessibility and applicability, its focus has shifted toward assessing Exchanges' programming impacts and outcomes.

Online Survey Component

The JFSP Exchanges are unique entities that share one key objective: to improve fire science delivery by increasing the accessibility and applicability of fire science information. Whereas each Exchange has developed a unique set of outreach and educational activities intended to further this objective, many similarities emerge upon examining individual Exchange's goals as proposed to the JFSP Board. For instance, many aim to improve relationships between fire practitioners and scientists, provide more interactive learning opportunities for fire practitioners, and to synthesize and clarify current fire science research results. The online survey was developed in collaboration with Exchanges' principal investigators and coordinators to assess progress toward these and other shared goals, as well as the effectiveness of common strategies aimed at facilitating goal attainment.¹

As with other national evaluation components, the online survey aims to enhance continued understanding of the impacts and obstacles Exchanges experience in striving toward shared goals. To achieve this understanding, new survey data must be collected at regular intervals. All Exchanges have the opportunity to redistribute the online survey each spring and are required to do so at least once every two years. Survey redistribution requirements and recommendations for each Exchange depend upon the individual funding and renewal schedule. Thus, data collected during each annual wave of survey distribution reflects a slightly different group of participating Exchanges. Slight modifications to help improve the survey may be made between annual distributions; however, the content remains similar across waves to facilitate analyses of trends over time.

The online survey is intended as an aggregate assessment. Despite annual variations in Exchanges' participation, the overarching objective of the survey is to assess JFSP progress toward their goals *as a whole*. This section first reports the comprehensive results obtained from the spring 2014 online survey, which was distributed by six of the JFSP Exchanges. This analysis summarizes Exchange constituents' most current opinions and experiences regarding fire science delivery. Next, comparisons of mean scores across the four survey waves (conducted from 2011-2014) are examined as a way to examine changes over time.

Three frames of the online survey were developed in order to capture the perspectives and experiences of distinct audiences. The first targets *Consumers* of fire science information, or fire managers/practitioners, whereas the second targets *Producers* of fire science information, or fire researchers/scientists. The third frame is intended for members of the *General Public* which are essentially all other respondents who may be exposed to Exchange outreach or educational activities but do not identify as fire science professionals. When possible, items in the Consumer and Producer survey were constructed to be complementary or parallel. The General Public frame in particular differs from the other two frames; it focuses more on basic experiences and preferences regarding fire science information. Thus, following a description of

¹ Please refer to the 2010-2011 Report for Wave 1 results and a comprehensive discussion of online survey development and design.

the survey method and participants, this section presents specific results for each frame separately.

Method

Six Exchanges actively recruited participants for Wave 4 of the online survey. Each participating Exchange launched the survey between March 2014 and July 2014, at a time deemed most appropriate depending on an Exchange's stage of development, location and fire season. "Contact lists" with potential participants' names and email addresses were used by each participating Exchange for recruitment purposes. These were developed by compiling existing email lists, contacts from prior needs assessments, and registrants at websites and various educational activities. To reach as many participants as possible, a "snowball" sampling strategy was used, whereby existing contacts were encouraged to forward the survey invitation to any other qualified or interested participants. University of Nevada, Reno Institutional Review Board certification was sought and obtained for all data collection activities described in this report.

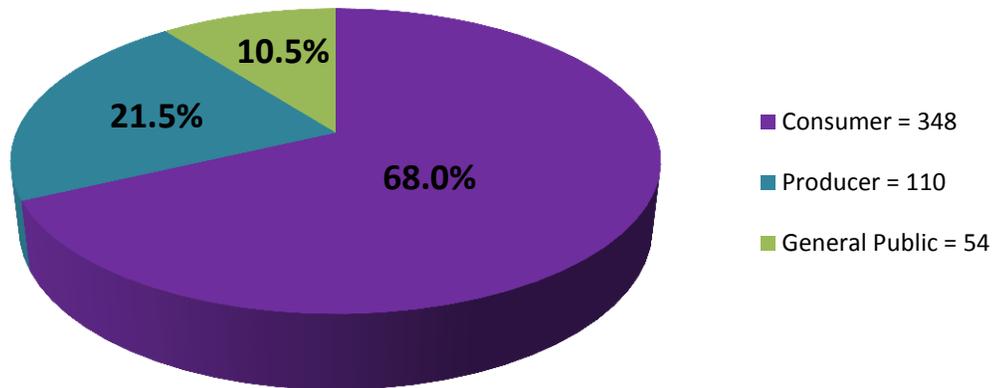
Recruitment followed the Dillman method (Dillman, Smyth & Christian, 2009), which recommends that participants receive three separate invitations to participate in survey research: an initial recruitment notice, a follow-up reminder and a final reminder. All participating Exchanges forwarded these invitations via email (staggered across approximately six weeks, with two weeks between each distribution) to all those on their respective contact lists. Participants accessed the survey via the link included in all recruitment emails. Upon entering Survey Monkey (the online survey host site), participants were asked to select their primary identification (Consumers of fire science information, or managers/practitioners; Producers of fire science information, or researchers/scientists; or the General Public, encompassing landowners/community members not currently employed in a fire science profession). Based on these responses, participants were electronically directed to the appropriate survey frame. Participants subsequently responded to a variety of multiple choice items depending on survey frame. Upon completing the survey, participants were thanked and redirected to the JFSP website home page.

Participants

A total of 528 individuals accessed the spring 2014 online survey and agreed to participate, and 512 (97.0 percent) of these participants completed the entire survey.² Among those who began the survey, 68.0 percent ($N = 248$) identified themselves as Consumers of fire science information, 21.5 percent ($N = 110$) identified themselves as Producers of fire science information, and 10.5 percent ($N = 54$) identified themselves as the General Public/community members (see Figure 1). Participant demographics (gender, age, ethnicity and role) are reported with a discussion section for each survey frame.

² The percentage of respondents who completed the entire survey is similar to that obtained in survey years 2011, 2012 and 2013. There were no noticeable patterns regarding attrition, with individuals discontinuing participation at various points throughout the survey. All responses up to the point of discontinuing the survey were included in analyses.

Figure 1. Primary Identification of Survey Respondents



Six Exchanges actively recruited participants for the spring 2014 survey. To minimize survey fatigue among their regional respondents, only the Alaska, Appalachians, California, Lake States, Southern Fire Exchange, and Southwest Exchanges were required to redistribute the survey. Yet, many participants affiliated with other Exchanges responded to the survey due to the snowball sampling procedure and regional geographic overlap across Exchanges. As a result, only one of the existing JFSP Exchanges was not represented in the 2014 online survey.

In the spring 2014 survey, participants were asked to identify the primary Exchange in which they worked or lived. Table 1 displays the frequencies of survey respondents per frame who self-identified with an Exchange affiliation. Consumer and Producer participants also were asked to identify any other Exchanges in which they worked. Approximately 40 percent of Consumer respondents and 50 percent of Producer respondents indicated that they worked in more than one Exchange.

Table 1. Number of Online Survey Respondents by Fire Science Exchange

Fire Exchanges	Consumer <i>N</i>	Producer <i>N</i>	Public <i>N</i>	Total <i>N</i>
Alaska	23	3	2	28
Appalachians	40	7	2	49
California	63	22	17	102
Great Basin	4	0	0	4
Great Plains	8	10	3	21
Lake States	27	7	0	34
Northern Rockies	3	0	0	3
Northwest	15	2	0	17
Oak Woodlands	0	0	0	0
Pacific	3	1	0	4
Southern	69	9	0	78
Southern Rockies	4	3	7	14
Southwest	29	16	2	47
Tallgrass	8	6	9	23
National Level	1	3	0	4
Other	2	3	3	8

Note. These figures reflect the number of participants who completed the entire survey and explicitly identified their primary fire Exchange via a multiple choice survey item.

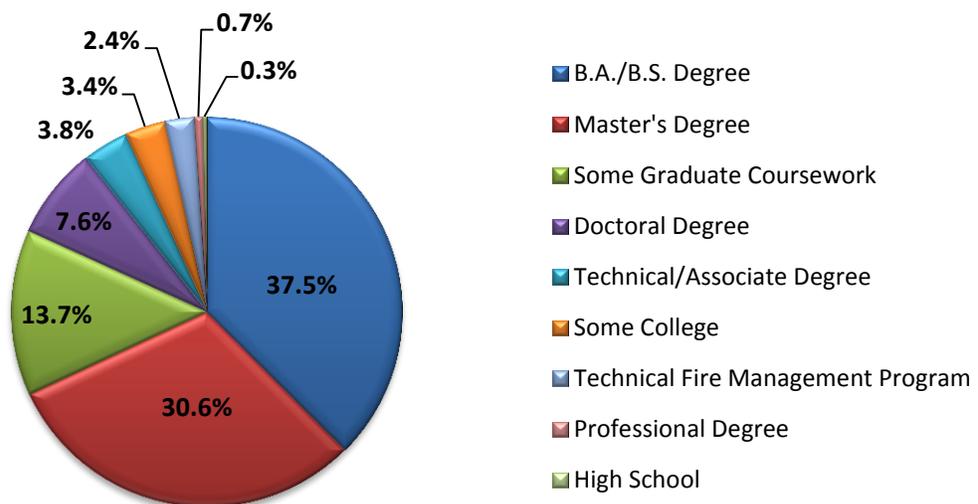
Consumer Survey Results

Consistent with findings from Waves 1, 2 and 3 of the online survey, Consumers were by far the most represented group of participants. More than two-thirds (68 percent, $N = 348$) of total survey respondents identified as Consumers of fire science information, working as fire managers, practitioners or technical specialists. As Consumers are the primary target of Exchanges' outreach and educational activities, the Consumer survey also is the most extensive of the three frames. Consumers were asked to respond to a variety of multiple choice items, including those targeting their experiences with fire science information and information producers; opinions and experiences regarding their regional Exchange and the Exchange's website; experiences with fire science information sources; and perceptions of obstacles to accessing and applying fire science information. As with the other survey frames, Consumer question items targeted perceptions of Exchanges' progress toward shared goals, effectiveness of broader educational activities/interventions, and identification of strengths and challenges in improving fire science delivery. Whenever possible, question items were designed to assess short- and medium-term outcomes of Exchanges' programming in terms of the Logic Model (changes in awareness, knowledge, attitudes, motivations, behaviors and policy/practices).

Consumer Demographics

Consumer survey respondents were primarily male (66.9 percent) and Caucasian (89.3 percent). Other reported ethnicities included Multi-Ethnic (1.5 percent), Hispanic/Latino (1.5 percent), Asian/Pacific Islander (1.1 percent), American Indian (0.7 percent), and Black (0.4 percent). The mean age of Consumer survey respondents was 50.67 years. Consumer respondents were experienced and well-educated. Average reported length of time working as a fire practitioner/manager was 18.8 years, and the majority had earned a bachelor's or post-baccalaureate degree (see Figure 2).

Figure 2. Consumers' Educational Backgrounds



Similar to previous years, the majority of respondents described themselves as either natural resource specialists (37.2 percent) or fire managers/practitioners (25.9 percent). Additional reported roles included other specializations: firefighter (7.8 percent), line officer/decision maker (4.4 percent) and land management support (3.8 percent; see Figure 3). Many respondents chose “Other” to describe their role. Responses included a variety of managers, weather specialists, foresters, ecologists, biologists and other diverse specialists (including fuel, public relations, etc.). Most Consumers were affiliated with federal organizations (43.7 percent), followed by state agency/organization (26.4 percent); nonprofit organizations (9.8 percent); local agencies/organizations (9.5 percent); the private sector (7.1 percent); university-based (3.1 percent); or a tribal agency/organization (0.3 percent); see Figure 4).

Figure 3. Primary Role of Consumers

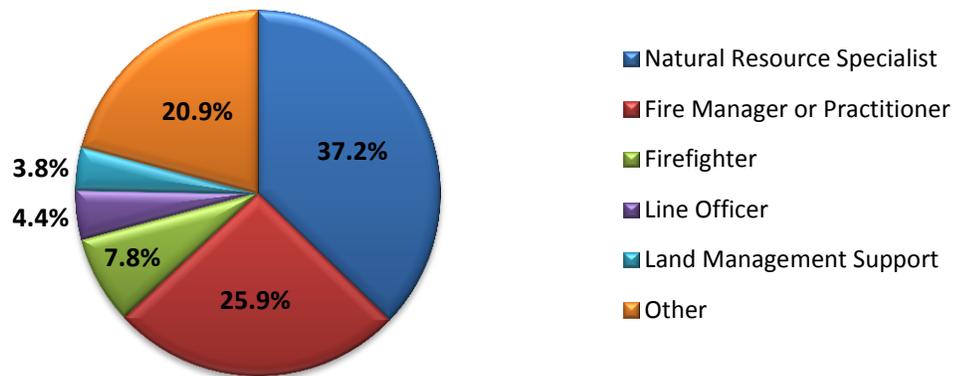
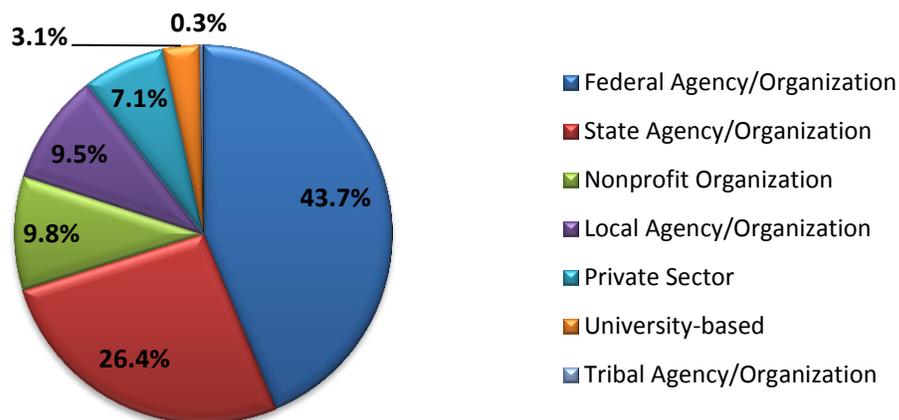


Figure 4. Affiliation of Consumers



Experiences with Fire Science Information and Information Producers

The first section of the Consumer survey instructed participants to indicate their level of agreement with 13 statements targeting their perceptions and experiences concerning fire science information and fire science information Producers. In addition, this section included two additional categorical response items regarding collaboration between fire science information Consumers and Producers. These items were designed to yield basic information regarding the accessibility and applicability of fire science research results and tools from the manager/practitioner perspective, as well as to help determine the extent to which increases in fire science knowledge impact decision-making and behaviors. In their proposals to the JFSP Board, most Exchanges emphasize the importance of fostering communication among Consumers and Producers of fire science information as a means of ultimately enhancing fire science delivery. Thus, several items in this section also focus on Consumers' perceptions and experiences regarding fire science information Producers to obtain a better understanding of the relationships between these two groups. According to the Logic Model framework, most items were constructed to assess short-term (changes in beliefs, attitudes, awareness and knowledge) and medium-term (changes in decision-making and behaviors) outcomes of Exchanges' programming. Changes and improvements in these areas are detailed in the *Trends across Survey Waves* section of this report.

Table 2 displays Consumers' mean responses to items targeting their basic experiences and opinions concerning fire science information. All mean responses occurred at the positive end of the scale, indicating relatively favorable evaluations of fire science information accessibility and applicability. Similar to previous years, Consumers expressed the strongest agreement with the statement, *Fire science information enhances my effectiveness on the job*, and were least likely to agree with the statement *Fire science information is easy to apply to my specific problems*, (although mean responses to this item still fell on the positive end of the scale). This is consistent with key issues highlighted by Exchanges in their funding proposals; namely, that Consumers face challenges in accessing fire science research results and tools relevant to their work and/or in translating and adapting extant fire science information for their own use. Progress on these key issues will be discussed in the section *Trends across Survey Waves* as mean responses to these items have improved over the survey waves.

Table 2. Consumer Perceptions and Experiences Regarding Fire Science Information Accessibility and Applicability

Item	Mean (SD)
Using fire science information enhances my effectiveness on the job	4.12 (0.69)
Fire science information should be shared more frequently within my agency/organization	4.06 (0.74)
I trust fire science research findings	3.78 (0.73)
I often draw on fire science research when making work-related decisions	3.76 (0.86)
Fire science information is easy to find	3.61 (0.80)
During the past year, I have changed at least one thing in my work based on what I've learned about fire science	3.60 (0.90)
Fire science information is easy to understand	3.43 (0.79)
Fire science information is easy to apply to my specific problems	3.28 (0.85)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Table 3 displays Consumers' mean responses to items targeting their perceptions and experiences concerning Producers of fire science information (fire science researchers/scientists). All responses to these items were at the positive end of the scale (with the exception of the negatively framed items), suggesting that Consumers have relatively favorable opinions of fire science information Producers and their work.

Table 3. Consumer Perceptions and Experiences Regarding Producers

Item	Mean (SD)
Fire science researchers/scientists are easy to approach	3.52 (0.81)
Fire science researchers/scientists value my knowledge and experience as a field professional	3.50 (0.82)
Fire science researchers/scientists are willing to directly work with me if I have questions about research or how to apply fire science at my job	3.46 (0.76)
Fire science researchers/scientists are reluctant to study problems and issues suggested by local managers/practitioners*	2.69 (0.84)
Fire science researchers/scientists rarely provide information that helps me address the management problems I face*	2.55 (0.97)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree. *Indicates the items were negatively framed (thus lower mean values on these items indicate more positive perceptions and experiences regarding fire science information producers).

Table 4 displays the frequency of responses to the two categorical items regarding Consumers and Producers working together. A little over half of all Consumer respondents (54.3 percent) reported that they had worked with fire researchers/scientists on a research or management

project, and most Consumers (76.7 percent) said they would like to work with or continue working with Producers.

Table 4. Consumer Perceptions and Experiences Regarding Working with Producers

Item	Yes	No	Unsure
Have you worked jointly with fire researchers/scientists on a research or management project?	54.3%	45.7%	N/A
Would you like to work/continue to work with fire researchers/scientists on a research or management project?	76.7%	1.0%	22.3%

Items Regarding Fire Science Exchange Efforts

Due to the varying developmental stages of the Exchanges, it was expected that some respondents would be unfamiliar with their Exchange and its link to regional fire science activities and outreach efforts. Thus, prior to receiving any survey items explicitly referencing Exchanges, respondents were asked whether they were aware of a fire science and delivery Exchange in their region supported by the Joint Fire Science Program. Most were aware of their regional Exchange (85.3 percent) and were subsequently asked to respond to seven items regarding their opinions and experiences about their Exchange. The remaining 14.7 percent of respondents who indicated that they were unaware of their regional Exchange skipped these items and continued on to the next portion of the survey.

As shown in Table 5, all mean responses fell at the positive end of the scale as well as stayed in the same rank order as was seen in Wave 3. Consistency in ranking of these statements across waves indicates growing consensus among Exchange participants on these items. Also, mean responses to all items have slightly improved over the last few waves and indicate a general positive trend toward achieving Exchange goals (see *Trends across Survey Waves* section for more details). Additional wave data will help to clarify these trends. Importantly, respondents still indicated the highest level of agreement with the statement that *The Exchange is needed to help coordinate sharing of fire science information in my region*, pointing to overall agreement that Exchanges have been fulfilling their primary purpose.

Table 5. Consumer Opinions and Experiences Regarding their Regional Exchange

Item	Mean (SD)
The Exchange is needed to help coordinate sharing of fire science information in my region	4.23 (0.68)
The Exchange has helped improve the accessibility of fire science information	4.19 (0.71)
I would recommend Exchange involvement to my co-workers	4.13 (0.78)
The Exchange has helped improve the use and application of fire science in my region	3.96 (0.80)
The Exchange has helped improve communication among fire managers/practitioners and fire researchers/scientists in my region	3.86 (0.83)
The Exchange has made it easier for my agency/organization to accomplish its goals	3.37 (0.82)
The Exchange has helped improve policy regarding fire management in my region	3.28 (0.82)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Evaluation of Fire Science Exchange Websites

A review of initial and renewal funded proposals reveals that all JFSP Exchanges aim to establish and continuously improve individual websites. These websites are critical in fostering Exchanges' progress toward their overarching goals. Lack of time and the observation that *fire science information is not available in one convenient place* are commonly cited obstacles to accessing and applying research results and tools. The Exchange websites help to organize fire science research results and resources for busy fire science professionals and other interested users. The websites also inform users of continuing learning opportunities and Exchange-sponsored activities. Websites incorporating interactive components (communication forums and features allowing managers/practitioners to submit questions to researchers/scientists) can help foster relationships between fire science information Consumers and Producers.

The purposes and impacts of the Exchange websites are further discussed in the Webmetrics section of this report. Considering the importance of these websites in enhancing fire science delivery, we continued to explore Consumers' experiences and opinions regarding their Exchange websites using six multiple choice items and one open-ended response item in the online survey.

The Exchanges are all in varying phases of website development and improvement, and are continually seeking to reach new users. Thus, it was expected that some respondents would not be able to report on their experiences with their Exchange's website. Prior to receiving any website-related items, Consumers were asked if they had visited their Exchange's website. Well over three-quarters (81.3 percent) indicated that they had visited the website; only these respondents were questioned further about the website. The remaining 18.7 percent of

respondents did not receive any other items about the Exchange website and were electronically redirected to the next portion of the survey.

Quantitative Consumer Responses

Respondents indicating that they had visited their Exchange’s website were next asked to respond to five question items. Mean responses to these items indicate that users were satisfied with website content, with most agreeing that their website provided a variety of current and practical information (see Table 6). Consumers also were asked whether their Exchange’s website included an interactive feature (for example: *Does your Exchange’s website provide a forum where you can share information and ask questions?*). Most respondents were *not sure* if their Exchange’s website offered this type of feature (67.6 percent). Over a quarter of respondents said that their Exchange’s website did provide an interactive forum (29.2 percent), and 3.2 percent specified that such features were not available on the website. Thus, although responses to website-specific items were generally quite positive, they do suggest that Exchanges may wish to improve the general organization of fire science information within their websites and further promote interactive website components. That is, many websites include interactive components but users are still unaware of them or may not understand how to use them.

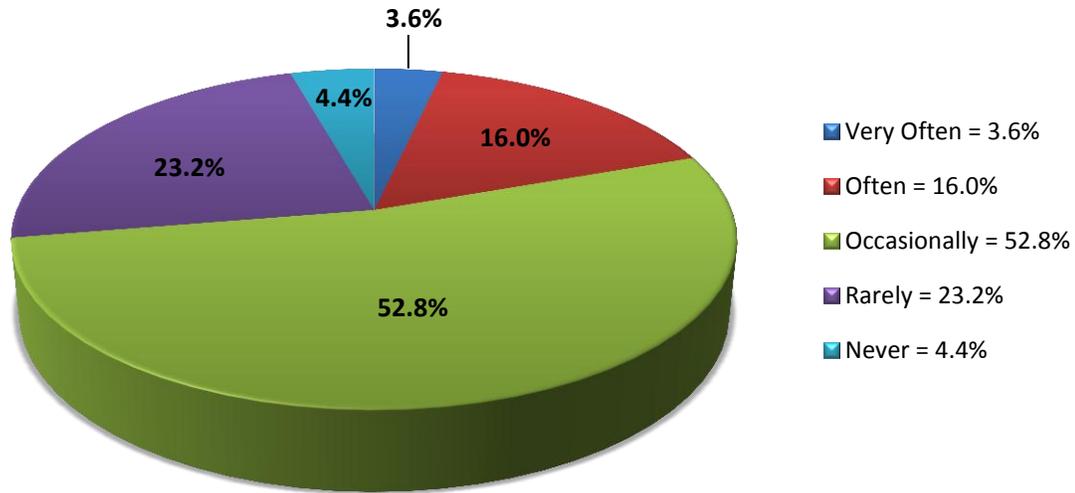
Finally, users were asked to indicate how often they used information obtained from their Exchange’s website in their job during the past year. Results suggest that most respondents applied such information on the job *Occasionally* (M = 2.91, SD = .84; see Figure 5 for response frequencies). When compared to previous wave responses however, trends indicate a movement toward more website information use among Consumers. As detailed in the *Trends across Survey Waves* section of this report, the reported application of fire science information obtained from Exchange websites has increased since the 2012 survey distribution. This is a positive result and may indicate that users have become more familiar with their Exchange’s website and are starting to apply what they have learned in their job.

Table 6. Consumer Responses Regarding their Exchange’s Website

Item	Mean (SD)
My Exchange’s website provides information that is current and up-to-date	3.95 (0.65)
My Exchange’s website provides a wide variety of fire science information	3.95 (0.65)
My Exchange’s website is user-friendly	3.86 (0.65)
My Exchange’s website provides practical information I can use in my job	3.86 (0.74)
My Exchange’s website organizes the information I need in one convenient place	3.68 (0.76)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Figure 5. Frequency of Fire Science Exchange Website Information Use by Consumers on the Job



Qualitative Consumer Responses: Additional Survey Responses Concerning Exchange Websites

After responding to the closed-ended items about their Exchange’s website, Consumers had the opportunity to provide suggestions, thoughts about website features or organization, or other experiences with the website. A total of 42 Consumers responded.³ Respondent comments are direct quotes, however, any use of the terms “consortia/consortium” was changed to “Exchange” to reflect current terminology (changes are highlighted by brackets). Overall, comments were positive and conveyed appreciation of the websites. The most common themes in Wave 4 were approval or suggestions for Exchange websites.

◆ **Positive comments.** Several respondents expressed an appreciation for their Exchange’s website generally, commented specifically on website content like webinars and one-page research summaries, or highlighted how the websites were helping to reach overarching JFSP goals.

1. General positive comments:

- “Excellent resource.”
- “Best thing that has happened for me. In General, the only education I receive for fire ecology science through work.”

³ A thorough analysis of all commentary provided is beyond the scope of this report; however, a complete text of all open-ended comments offered here and elsewhere in the report is available upon request.

- “A VERY GOOD start and I hope the [Exchange] continues to receive funding to refine delivery of products and services.”
- “I think that as society continues to move information to the web it is important to keep up with innovations in information delivery. The website is good because it has been updated, this will continue to be the case in the foreseeable future.”

2. Approval of specific website content:

- “The webinars have been terrific. I use the archived webinars repeatedly and refer others to them.”
- “I like that they post the webinars and information on the website. At times I cannot attend the live webinar but can refer to the website. I also like that the [Exchange] jointly offers meetings with seasonal meetings i.e. Spring Fire and Fall Fire. This is a chance to be face to face. Keep up the great work.”
- “I really like the one-page research summaries. They are informative and I can get more info if I need it.”

3. How the websites contribute to overall JFSP goals:

- “It is my opinion that the [Exchange] has been very effective at getting Universities more aligned with the field units. Additionally it has given the field units access to University information and people. That is its great value.”
- “Lately I have particularly been impressed how the [Exchanges] share information about important or developing issues amongst the regions. I wish there was more of this. In some cases, it would be worth traveling a bit to attend a workshop or conference offered by another [Exchange]. It seems this kind of information is being shared more regularly - a positive for me. As we continue to face challenges in the world of prescribed fire and learn more about the critical role application of fire plays on the landscape, these [Exchanges] fill a vital role.”

- ◆ **Suggestions for improving Exchange websites.** Although comments largely remained positive, many respondents suggested additional website content. Improvements for website content included more explicit connections between fire science research and its application in real world settings, greater outreach to the public, situating the Exchange websites into the larger scope of fire science, adding links to other fire science websites and improving specific features.

1. Explicitly connecting research to its application:

- “It would be very helpful if scientists and presenters could provide more tangible management applications for the research findings. With many of the webinars and documents posted, they go into much detail but fail to provide How to Apply the Findings to our management actions and decision making. Researchers need to take their findings one or two steps further and provide the usefulness of the info in real scenario discussions on how the findings actually apply to our needs. Examples, What-Ifs, and Management Decisions that can benefit from the research findings would be very helpful. I am often left (after a webinar or reading a research document) wondering if and how I can actually apply the findings to my work. We're getting closer to the true usefulness and user friendliness of the [Exchange]! Let's keep it going! Thanks!”
- “Management recommendations from research results are often written from the narrow perspective of an academic and the limited of scope of the experiment without consideration to real world constraints like policy, politics and budget. Managers want action, researchers want data, modelers want time. Need more investment in fire-doers and associated tools for any chance to apply fire knowledge at a meaningful scale and duration.”

2. Connecting with the public:

- “I believe Social Science (smoke impacts and air quality) and Wildland Fire Education should begin to take center stage. Until we have a more informed/educated public and natural science curriculum in our schools we will continue to struggle to implement the large landscape scale treatments that are vital. The public perception out there is ‘let us cut more, graze more and our watersheds will be less vulnerable to catastrophic fire in the future.’ I know JFSP promotes hard science and we need that, but our obstacles have more to do with people and politics - that to me is the tougher knowledge hurdle as opposed to not understanding forest and watershed dynamics.”
- “Wish the website could be an informational source for the media.”

3. Providing context within the larger scope of Fire Science Information:

- “I think that the fire science/management community as a whole should find a way to share the same set of information describing ALL their web-based information sources and tools. In other words, there are a lot of sites out there, each with different niches. It's kind of overwhelming. No one can be everything to everyone. But people consulting & using the sites will feel more comfortable if they know how the site they are consulting fits into the big picture. I had to research for quite a while before I got a feeling for the fire science information ‘ecosystem’ out there.”

4. Adding links:

- “Need to add links to those things such as the data basin, climate change... weather, IFTDSS, etc.”
- “There is a lot of fire science and information out there, and I find myself using many websites to obtain it (FS library, Digitop, University sites, Tall Timbers, NGO sites, etc). My vision for the [Exchange] websites is to be one stop shopping for all of that, but that has not happened. I still get a lot of papers and workshop/ conference information via email, often through informal channels. Not that there's anything wrong with that, but I think we miss some people that way.”

5. Improving features:

- “Updates including current calendar and more literature would be valuable, add more webinars of links for regionally pertinent webinars offered through fire exchange and lessons learned center.”
- “I find the research easy to find when I know what publication I am trying to locate. To just go on the website and find publications related to a topic, it is difficult and sometimes overwhelming - or I have not figured out how. I use several [Exchange] websites and this is an issue with all of them to some degree.”

Although comments come from a limited sample and may or may not represent majority views, common themes nonetheless indicate areas for Exchanges’ consideration. Feedback suggests that overall respondents are happy with Exchange websites and want websites to do more (such as have more links, communicate more information, or be more explicit with how fire science research can be implemented). When compared to previous waves, these comments are encouraging and may indicate Exchange websites have been successful engaging the fire science community and conveying fire science information. Overall the comments highlight the continued need for Exchange websites to act as a vehicle for communication of fire science across many diverse individuals and regions.

Experiences with Fire Science Information Communication Sources

The JFSP Exchanges have proposed and implemented many strategies for disseminating current and practical fire science information to Consumers. Such plans include the development and expansion of web-based sources, newsletters, fact sheets and brochures, as well as increasing the number of interactive learning opportunities available to Consumers (such as workshops and field demonstrations). Accordingly, the online survey examined Consumers’ basic experiences with 11 common communication sources of fire science information. Consumers were first asked to indicate how often they had *accessed* information from each source during the last year. Next, Consumers were asked to rate the *usefulness* of the information they had accessed from each source. Because not all sources had been accessed by all participants,

sample sizes for usefulness varied, ranging from 188 (*field tours and demonstration sites*) to 267 (*research briefs, fact sheets and brochures*). Responses may help focus Exchanges’ efforts toward disseminating fire science information via preferred (useful and accessed) communication sources.

Table 7 displays Consumers’ mean responses to items assessing perceived usefulness of fire science information obtained from common communication sources and the frequency with which respondents accessed information via these sources, ranking responses by the usefulness rating. Responses to these items were more variable than those to other survey items, as indicated by larger standard deviations. This may be attributable to differences in learning opportunities extended to Consumers, varying levels of exposure to communication sources, and individual learning preferences.

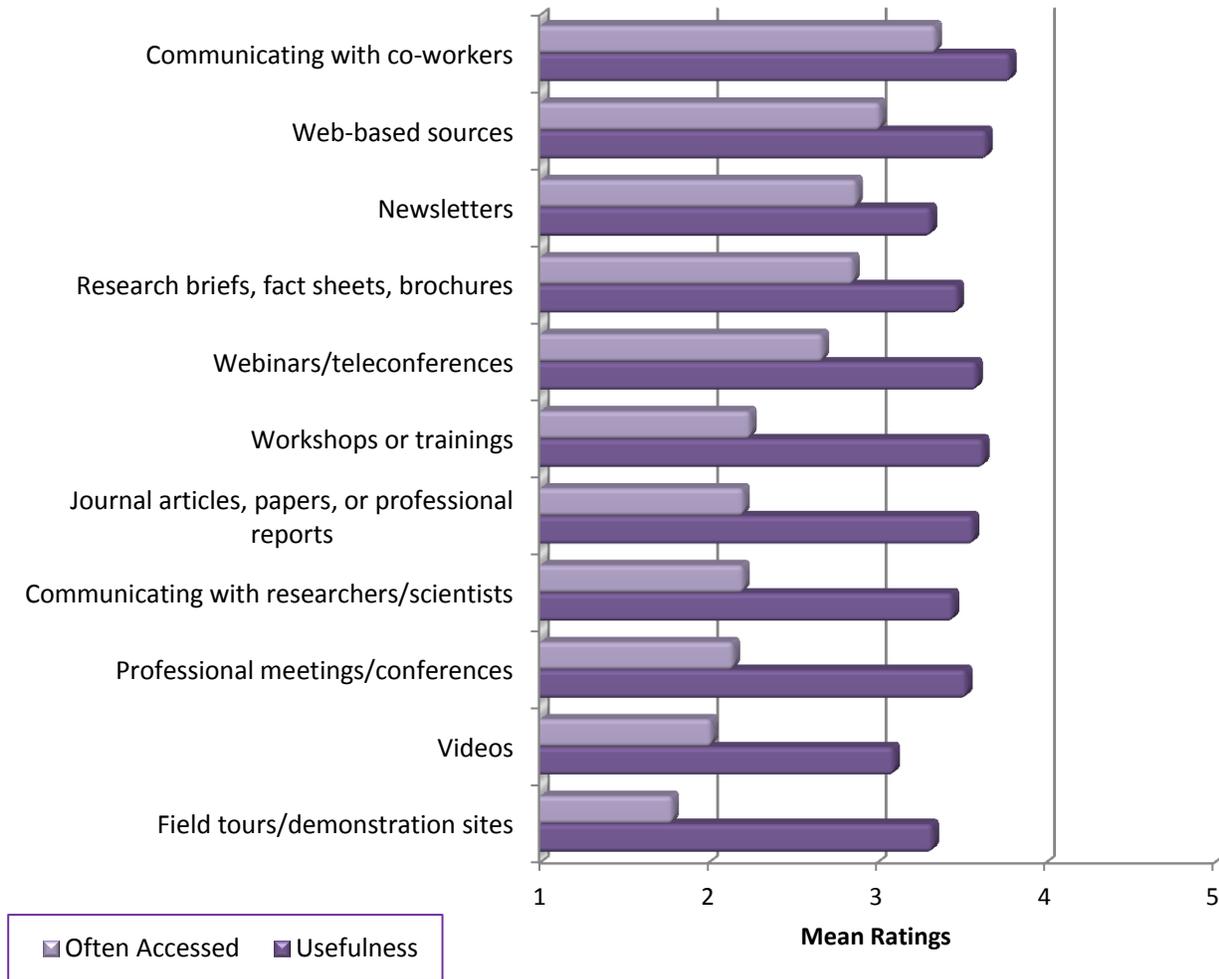
Table 7. Mean Ratings of Fire Science Information Communication Sources: Frequency of Access and Perceived Usefulness

Communication Source	Usefulness Mean (SD)	Often Accessed Mean (SD)
Communicating with co-workers	3.79 (1.08)	3.35 (1.31)
Web-based sources	3.65 (0.99)	3.02 (1.10)
Workshops or trainings	3.63 (1.23)	2.25 (0.98)
Webinars/teleconferences	3.59 (1.17)	2.68 (1.11)
Journal articles, papers or professional reports	3.57 (1.06)	2.21 (0.99)
Professional meetings/conferences	3.53 (1.23)	2.15 (0.96)
Research briefs, fact sheets or brochures	3.48 (0.99)	2.86 (0.90)
Communicating with researchers/scientists	3.45 (1.33)	2.21 (1.04)
Field tours/demonstration sites	3.33 (1.46)	1.79 (0.90)
Newsletters	3.32 (1.03)	2.88 (1.08)
Videos	3.10 (1.22)	2.02 (0.95)

Note. A 5-point Likert scale was used. Often Accessed scale rated responses where 1 = Never and 5 = Very Often. Usefulness scale rated responses where 1 = Not Useful and 5 = Very Useful. Because some Consumers had little or no experience with some of these information sources (had never accessed during the past year), not all respondents provided usefulness ratings.

Figure 6 displays *access* and *usefulness* ratings, ranking each communication source by how often each is accessed. The top two most frequently accessed communication sources (*communicating with co-workers* and *web-based sources*) were also the top-rated useful sources. Other communication sources varied in terms of their perceived usefulness versus how often they were actually accessed. For example, newsletters were rated as often accessed but they were not rated very high for usefulness (second to last). These findings suggest that Exchanges may want to concentrate on increasing the usefulness of communication sources that are most often accessed.

**Figure 6. Fire Science Information Communication Sources:
Mean Ratings of How Often Accessed and Usefulness**



Note. A 5-point Likert scale was used. Often Accessed scale rated responses where 1 = Never and 5 = Very Often. Usefulness scale rated responses where 1 = Not Useful and 5 = Very Useful. Because some Consumers had little or no experience with some of these information sources (had never accessed during the past year), not all respondents provided usefulness ratings.

Consumer Perceptions of Obstacles to Accessing and Applying Fire Science Information

In the final section of the Consumer survey, respondents were asked about their perceptions of obstacles to the accessibility and application of fire science information in their region. Specifically, they were presented with five potential obstacles, and instructed to indicate the extent to which they faced this obstacle. These items are included to help illuminate general strengths and gaps in the programming of the Exchanges. Results from prior and future waves of the online survey can be used to determine if such gaps are being addressed effectively (see *Trends across Survey Waves* section).

Table 8 displays Consumers' mean responses to items assessing their perceptions of obstacles to accessing and applying fire science information in their region. Responses to the obstacles items were more neutral than responses to any other item set in the survey and do not indicate any strong deficiencies in programming. Current results indicate that Consumers perceive lack of communication both *between* and *within* agencies and organizations as the top obstacles to accessing and applying fire science information. In prior waves of the online survey, *Fire science information is not available in one convenient place*, was the top-rated obstacle; this year it dropped to the last top-rated obstacle. Findings may indicate that Exchanges' efforts to organize and synthesize fire science information via their websites and written products have been effective in addressing this barrier. An increased focus on improving both inter- and intra-organizational communication may be warranted, considering the extent to which Consumers report learning through personal and on-the-job encounters.

Table 8. Obstacles Consumers Face in Accessing Relevant Fire Science Information

Obstacle	Mean (SD)
Lack of communication <i>between</i> agencies and organizations in my region decreases the accessibility of fire science information	3.33 (0.96)
Lack of communication <i>within</i> agencies and organizations in my region decreases the accessibility of fire science information	3.23 (0.96)
I have few opportunities to communicate with fire scientists/researchers	3.03 (1.02)
Available fire science information and/or research results are difficult to apply in the field	3.03 (0.93)
Available fire science information and/or research results are not presented in a way that managers/practitioners can easily digest and understand	2.89 (0.96)
Fire science information is not available in one convenient place	2.89 (0.95)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Producer Survey Results

The Producer survey frame is intended to complement the Consumer frame and provide a more comprehensive understanding of JFSP Exchanges' processes. Though many Exchanges primarily target Consumers, Producers can provide further insight regarding the relations between Consumer and Producer groups as well as additional perspectives on their regional situation (such as perceived impact of Exchanges' programming and obstacles in disseminating information). A total of 110 respondents (21.5 percent of the entire sample) self-identified as fire science researchers/scientists, and were thus directed to the Producer survey frame of the spring 2014 survey. The Producer survey frame is similar in structure and content to the Consumer survey frame. Producers responded to items concerning their experiences with fire science information and fire science information Consumers, fire-science related activities within their region, and perceptions of obstacles to the dissemination of fire science information. Like Consumers, Producers also were asked about their experiences and opinions regarding their specific regional Exchange and its website. The Producer survey frame is shorter than the Consumer survey frame, primarily targeting perspectives and behaviors regarding the dissemination of fire science research results as well as attitudes toward Consumers.

Producer Demographics

Producer respondents were mostly male (67.1 percent) and the majority were Caucasian (87.1 percent). Other reported respondent ethnicities included Hispanic/Latino (7.1 percent), Other (3.5 percent), Multi-Ethnic (1.2 percent), and Black (1.2 percent). The mean age of Producers was 47.0 years and they had worked as researchers/scientists for an average of 17.1 years.

All respondents completing the Producer survey had earned a college degree. Over half (65.9 percent) held a doctoral or professional degree, and one-fifth (20.9 percent) held a master's degree (see Figure 7). Though most Producers strictly identified themselves as fire science researcher/scientists (76.7 percent), some were student scientists/researchers (7.8 percent), natural resource managers/specialists (8.9 percent), or indicated more specialized roles using the Other category (including weather, forester and research ecologist; 5.6 percent; see Figure 8). Producers most commonly worked for a university-based organization (53.3 percent), followed by a federal agency/organization (28.3 percent); a non-profit organization (9.8 percent); the private sector (5.4 percent); state agency/organization (2.2 percent); and 1.1 percent worked for a local agency/organization (see Figure 9).

Figure 7. Educational Background of Producers

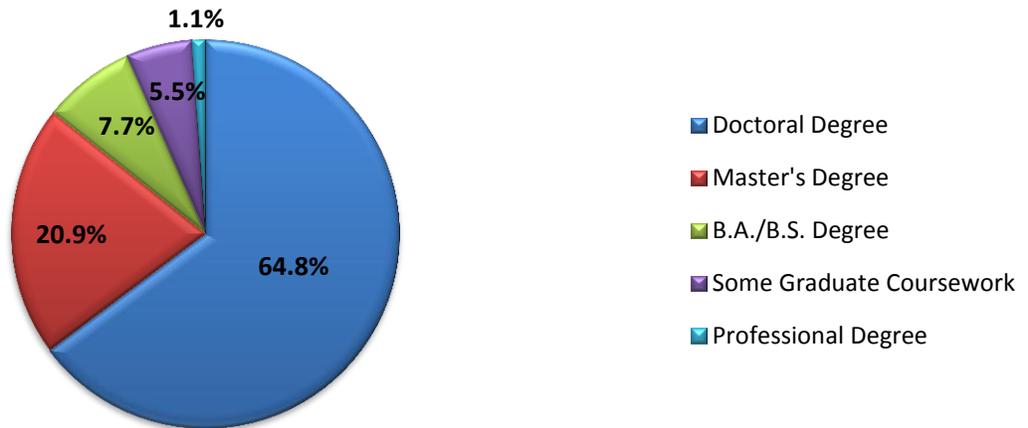


Figure 8. Primary Role of Producers

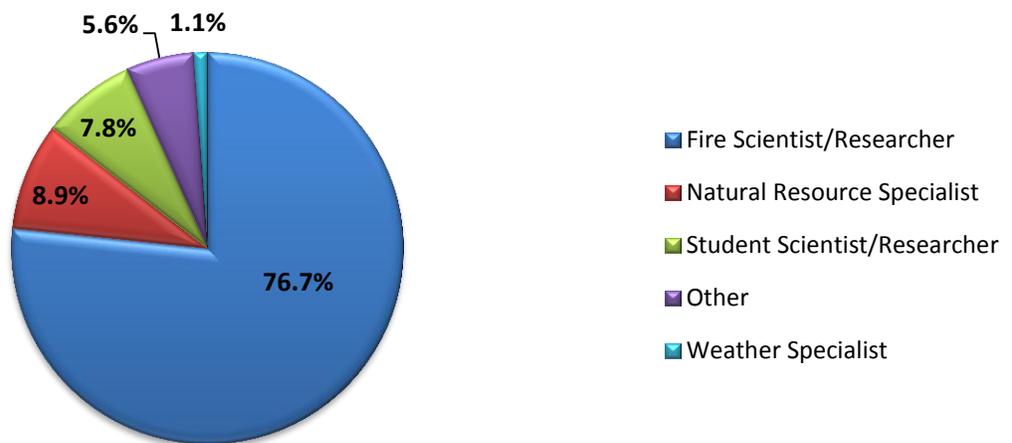
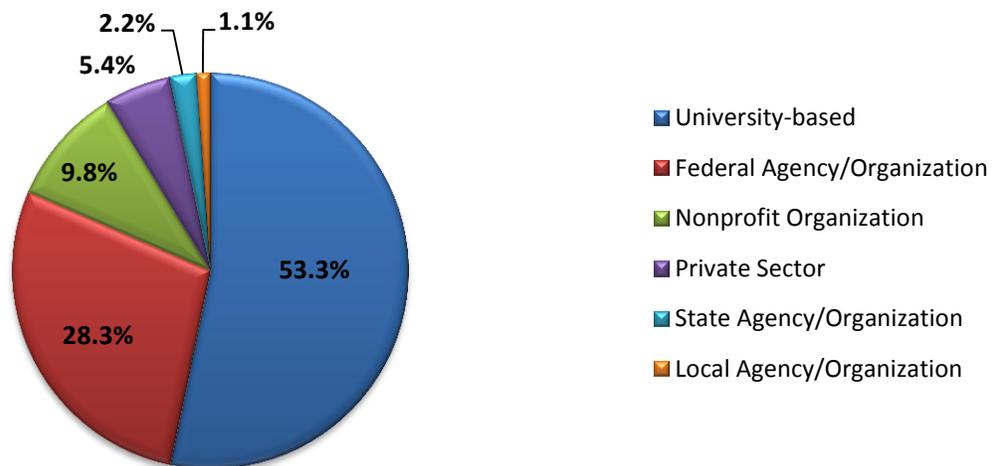


Figure 9. Affiliations of Producers



Producers Research Practices and Experiences with Consumers

Producers were first asked to complete a series of 11 items concerning their experiences with fire science information and Consumers of fire science information. Some of these items were complementary to those appearing in the first section of the Consumer survey frame. For example, Consumers were asked if they trusted fire science research findings, whereas Producers were asked if they believed that Consumers trusted fire science research findings; Consumers were asked if researchers/scientists were easy to approach, and Producers were asked if they considered themselves approachable. Other items focused on Producers' willingness to research applied problems and to communicate findings to Consumer audiences. In addition, Producers received two categorical response items asking whether they had worked with managers/practitioners and whether they desired to do so in the future. Consistent with the Logic Model approach to evaluation, items were constructed to assess short-term outcomes (changes in attitudes, beliefs, and behavior intentions) and medium-term outcomes (changes in actual behaviors) of Exchanges' programming.

Producers' mean responses to the first nine items are displayed in Table 9. Overall, Producers expressed favorable attitudes toward fire managers/practitioners and research endeavors targeting this population; similar to previous years, most Producers strongly agreed that, *Interacting with managers/practitioners enhances my effectiveness on the job*. However, mean scores on all questions with exception of the first, were slightly lower this year when compared to Wave 3 (see section *Trends across Survey Waves* for more details). One explanation may be that this year, more respondents identifying as Producers were not familiar with the Exchange in their region (12.4 percent). Producer respondents unfamiliar with Exchanges may be new to the region and/or less aware of the potential benefits of engaging Consumers. This may help account for the slight trend towards lower means on items regarding targeting applied fire science problems and interacting with Consumers.

Present results indicate that both Producers and Consumers have favorable perceptions of one another. There were some slight differences, however, between Producer and Consumer responses to parallel survey items. For instance, Producers' agreement with the statement, *Managers/practitioners value my knowledge and experience as a fire scientist* ($M = 3.74$, $SD = .76$) was slightly higher than Consumers' agreement with the statement, *Researchers/scientists value my knowledge and experience as a field professional* ($M = 3.50$, $SD = .82$). Though Consumers considered Producers to be approachable ($M = 3.52$, $SD = .81$), Producers rated *themselves* as even more approachable ($M = 4.26$, $SD = .58$). Finally, half of Consumers reported working with a researcher/scientist on a research or management project. The majority of Producers (92.9 percent) reported working with managers/practitioners on such a project (see Table 10). The majority of Consumers (76.7 percent) said that they would like to work/continue working with Producers on a project, whereas almost all Producers (95.9 percent) said that they would like to work jointly with managers/practitioners on a project. Although minimal, these differences could be the result of many factors. Perhaps there are just more Consumers than Producers overall, skewing results. It may be that there are fewer Consumers interested in research than Producers interested in applied work. Or the finding may indicate there is a

disconnect between the ways in which Consumers perceive Producers (regarding their approachability, willingness to collaborate and study applied problems, etc.), and Producers' self-perceptions. Unfortunately, the data do not clarify the reason for this discrepancy.

Table 9. Producer Research Practices and Experiences with Consumers

Item	Mean (SD)
Through my role as a researcher/scientist, I hope to improve how managers/practitioners make work-related decisions	4.53 (0.56)
Interacting with managers/practitioners enhances my effectiveness on the job	4.46 (0.68)
I make an effort to present information to managers/practitioners in a way that is easy to understand	4.41 (0.59)
I consider myself approachable to managers/practitioners	4.26 (0.58)
Managers/practitioners value my knowledge and experience as a fire scientist	3.74 (0.76)
I believe that managers/practitioners trust fire science research findings	3.56 (0.82)
I often present or publish fire science information for manager/practitioner audiences	3.71 (0.91)
I am sometimes hesitant to study problems and issues suggested by local managers/practitioners*	2.36 (0.99)
I prefer that my research be focused on theoretical issues, rather than on applied management problems*	2.15 (0.92)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree. *Indicates items were negatively framed (thus lower mean values on these items indicate more positive perceptions and experiences regarding fire science information consumers).

Table 10. Producer Perceptions and Experiences Regarding Working with Consumers

Item	Yes	No	Unsure
Have you worked jointly with fire managers/practitioners on a research or management project?	92.9%	7.1%	N/A
Would you like to work/continue working with fire managers/practitioners on a research or management project?	95.9%	0%	4.1%

Items Regarding Fire Science Exchange Efforts

As with Consumers, it was anticipated that some Producers would be unfamiliar with their regional Exchange at the time of survey distribution, and thus not equipped to respond to fire Exchange-specific items. Accordingly, Producers were first asked if they were aware of a fire science and delivery Exchange supported by the JFSP in their region prior to receiving any items referencing the JFSP Exchanges. Twelve respondents (12.4 percent) indicated that they were *not* aware of their regional Exchange; these respondents were electronically redirected to the next portion of the survey. The remaining respondents (87.6 percent) were then asked to respond to seven questions regarding their Exchange’s efforts.

The Exchange-specific items included in the Producer frame were identical to those in the Consumer frame. Mean responses were relatively positive and very similar to those obtained from Consumers. The majority of Producers agreed that the Exchange was needed and would recommend involvement to their co-workers, but were less certain regarding the effects of their Exchange’s activities on regional fire management policy (see Table 11).

Table 11. Producer Responses Regarding their Regional Exchange

Item	Mean (SD)
The Exchange is needed to help coordinate sharing of fire science information in my region	4.35 (0.61)
The Exchange has helped improve the accessibility of fire science information	4.35 (0.78)
I would recommend Exchange involvement to my co-workers	4.30 (0.66)
The Exchange has helped improve communication among fire managers/practitioners and fire researchers/scientists in my region	3.96 (0.77)
The Exchange has helped improve the use and application of fire science in my region	3.96 (0.79)
The Exchange has made it easier for my agency/organization to accomplish its goals	3.59 (0.79)
The Exchange has helped improve policy regarding fire management in my region	3.38 (0.77)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Perceptions of Fire Science Exchange Websites

Most of the Exchange websites target both Consumers and Producers of fire science information. Like Consumers, Producers may use their Exchange’s website to access current fire science research results, obtain information on learning and funding opportunities, and to network with other fire science professionals. In addition, interactive websites may provide more efficient means for Producers to share information regarding their current research projects and facilitate the application of their knowledge and expertise to Consumer problems. Most Producers (82.5 percent) indicated that they had visited their Exchange’s website. Some of these items were identical to those included in the Consumer survey frame (*My Exchange’s website is user-friendly*), whereas some differed according to the specific needs of Producers (*My Exchange’s website helps keep me informed of current research findings* and *My Exchange’s website provides a way for me to share my research products or fire science delivery activities*).

Producers’ mean responses to these website-specific items are displayed in Table 12. Most Producers agreed with Consumers that their Exchange’s website was user friendly, provided a wide variety of fire science information, and organized information they needed in one convenient place. Although over one-third of Producers (38.5 percent) confirmed that their Exchange’s website provided a forum to share information or ask questions, over half (52.6 percent) were unsure if such features were offered. The remaining 9.0 percent said that no interactive features were included in their Exchange’s website. These numbers remained stagnant from last year’s survey results and may suggest that Exchange websites could benefit from advertising interactive features.

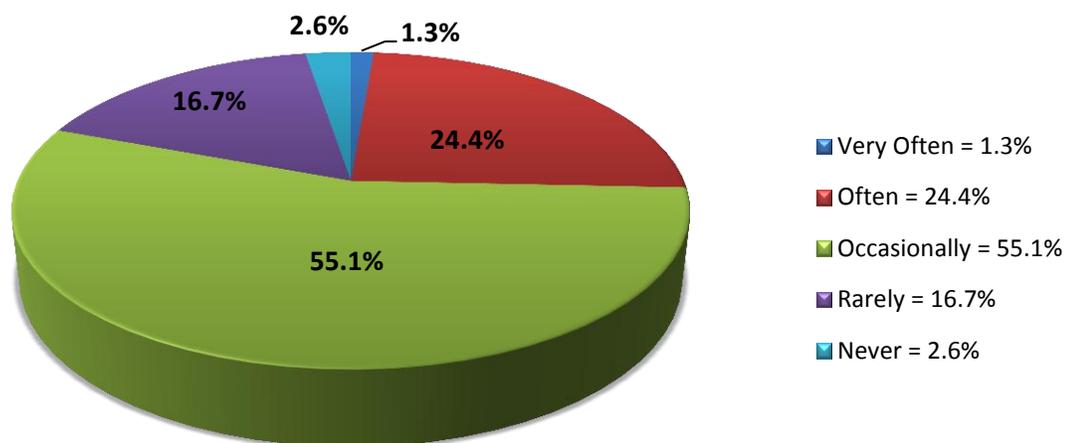
Table 12. Producers’ Opinions and Experiences Regarding their Exchange’s Website

Item	Mean (SD)
My Exchange’s website provides a wide variety of fire science information	4.13 (0.68)
My Exchange’s website is user-friendly	4.05 (0.67)
My Exchange’s website helps keep me informed of current research findings	4.00 (0.80)
My Exchange’s website organizes fire science information and other useful tools in one convenient place	3.95 (0.83)
My Exchange’s website provides a way for me to share my research products or fire science delivery activities	3.68 (0.92)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

When compared to previous waves, Producers were much more likely to report they had either *Occasionally* (55.1 percent) or *Often* (24.4 percent) used information obtained from their Exchange’s website at their job during the past year (see Figure 10). These results are encouraging and suggest that as Exchange websites become more established, Producers are finding the websites to be useful and a valuable source of fire science information.

Figure 10. Frequency of Website Information Use by Producers on the Job



Producer Perceptions of Obstacles to Fire Science Information Dissemination and Application

As described earlier, Consumers were asked about their perceptions of obstacles to accessing and applying fire science information. Because Producers focus on the development, execution and distribution of fire science research, they were correspondingly asked to share their perceptions of obstacles related to the effective dissemination and application of fire science information. Again, these items are intended to highlight gaps and strengths in Exchange’s performance related to the overarching objective of improving fire science delivery. Data obtained from prior and future survey distribution waves can help determine the extent to which strengths are being maintained and/or enhanced and to which gaps are being addressed.

Producer items were similar to those included in the Consumer survey, with the exception of *Managers/practitioners seem unreceptive or disinterested in current fire science research and information* (see Table 13 for Producer mean responses). Both Producers and Consumers identified the same two top obstacles: *lack of communication within agencies/organizations* and *lack of communication between agencies/organizations*. In the first two waves of the survey, Producers selected *Fire science information is not available in one convenient place* as the top obstacle. Last year this item moved to the third top rated obstacle and this year to the

fourth top rated obstacle; for Consumers, this item is the last rated obstacle. This obstacle may be moving down the list as Exchanges successfully fulfill one of their primary goals to organize and synthesize fire science information via their websites and written products. Data from additional survey waves can further clarify this trend.

Producers were more likely to rate the question, *Available fire science information and/or research results are not presented in a way that managers/practitioners can easily digest and understand* ($M = 3.30, SD = .95$) as an obstacle than Consumers ($M = 2.89, SD = .96$). Consistent with survey results from prior waves, most Producers did not implicate lack of opportunities to communicate with managers/practitioners as an obstacle to fire science information dissemination and application. Most also did not agree that *Managers/practitioners seem unreceptive or disinterested in current fire science research and information*. Consumers were only slightly more inclined to cite limited communication opportunities with researchers/scientists as an obstacle ($M = 3.03, SD = 1.02$). Yet, it is important that Exchanges continue in their efforts to increase Consumer awareness of such communication opportunities (via professional meetings/conferences, workshops, or interactive websites) and of Producers' willingness to work with fire managers/practitioners.

Table 13. Producer Perceptions of Obstacles to the Dissemination or Application of Fire Science Information

Obstacle	Mean (SD)
Lack of communication <i>between</i> agencies and organizations in my region decreases the accessibility of fire science information	3.58 (1.02)
Lack of communication <i>within</i> agencies and organizations in my region decreases the accessibility of fire science information	3.47 (0.92)
Available fire science information and/or research results are not presented in a way that managers/practitioners can easily digest and understand	3.30 (0.95)
Fire science information is not available in one convenient place	3.27 (0.88)
Available fire science information and/or research results are difficult to apply in the field	3.03 (0.95)
Fire scientists/researchers have few opportunities to communicate with managers/practitioners	2.84 (0.95)
Managers/practitioners seem unreceptive or disinterested in current fire science research and information	2.73 (0.98)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

General Public Survey Results

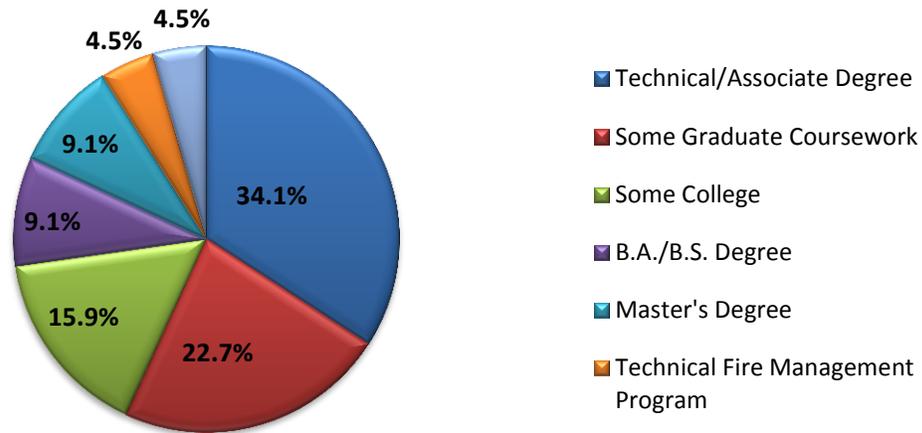
The General Public survey frame was intended for all other target audiences of the Exchanges' efforts and activities who were not primarily employed in fire management or research-related fields. This audience is highly diverse, including homeowners, large and small private landowners, retired fire science professionals, elected officials/decision makers, and other interested community members. The term "General Public" may be somewhat misleading, as several respondents had occupational and/or educational backgrounds in fire science-related fields (but were not currently employed in such professions). Understandably, those most affected by wildfire and those most interested in fire science-related issues also would be more likely to be exposed to Exchanges' educational and outreach efforts (and hence more likely to participate in the online survey). It is important to note, however, that the majority of General Public respondents categorized themselves as large or small private landowners.

Only a few Exchanges have specific plans to increase fire science information accessibility and applicability among the General Public, which again encompasses a variety of populations. Consequently, the General Public survey is the smallest of the three frames, both in number of respondents ($N = 54$) and in scope. The majority of General Public respondents stated that they lived in California (48.5 percent), followed by North Dakota (12.1 percent) and Alabama (9.1 percent). Five additional states (Alaska, Arizona, Hawaii, Maine, Texas, and Wyoming) each had one respondent. The General Public survey frame contains two main item sections: one focusing on experiences with fire science information, and the other assessing perceptions and experiences concerning various sources of fire science information.

General Public Demographics

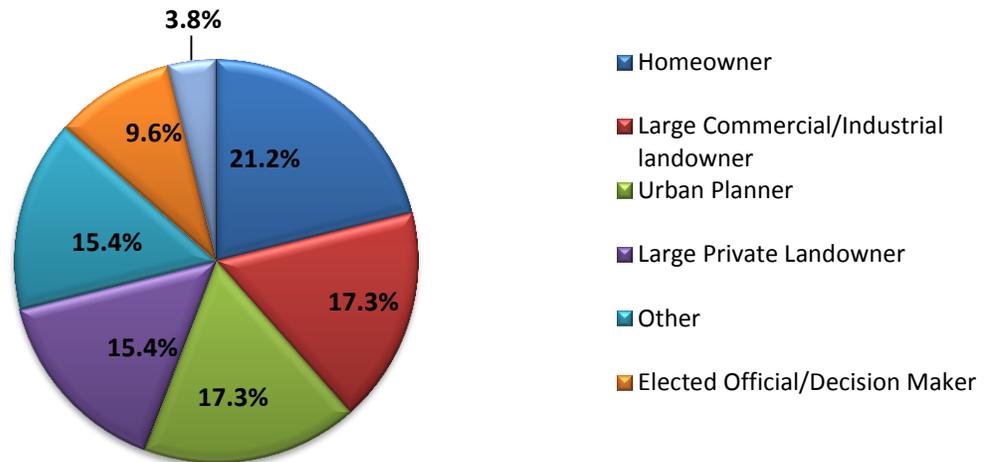
More than a half (61.4 percent) of General Public respondents were male. The average age of respondents in this frame was 59.2 years. Most were Caucasian (92.9 percent), followed by Hispanic/Latino (2.4 percent), Multi-ethnic (2.4 percent), or identified as Other (2.4 percent). A little more than one-third (34.1 percent) held a technical/associates degree, 22.7 percent completed some graduate coursework, 15.9 percent had attended some college, 9.1 percent earned a master's degree, 9.1 percent held a bachelor's degree, 4.5 percent held a degree from a technical fire management program, and 4.5 percent held a professional degree (see Figure 11).

Figure 11. Educational Background of General Public



Respondents indicated a wide variety of roles, demonstrating the diverse nature of the General Public survey sample (see Figure 12). Roles included homeowners (21.2 percent), large commercial/industrial landowners (17.3 percent), urban planners (15.4 percent), large private landowners (15.4 percent), Other (15.4 percent), elected official/decision makers (9.6 percent), and 3.8 percent were small private landowners. Those indicating Other either felt that they fit into more than one of the above categories or identified themselves as consultants, educators, or retired from a fire science-related field. All respondents generally indicated significant involvement with fire science-related issues.

Figure 12. Primary Role of General Public



General Public Experiences with Fire Science Information

General Public respondents were first asked to respond to a series of 13 items concerning their experiences with fire science information. Some of these items were similar to those in the Consumer survey frame, targeting the ease of accessing and understanding fire science information. Whereas many of the Consumer items referenced work-related practices, General Public items targeted beliefs, opinions, and behaviors regarding fire science information at a broader level. For instance, General Public respondents were asked about their basic awareness of fire science/management issues, their intentions for applying fire science information, and the degree to which they shared fire science information with others.

General Public respondents' mean responses to the first series of items are displayed in Table 14. As was the case with prior online survey waves, current findings indicate a strong interest among the General Public to learn more about fire science/management issues. General Public respondents reported positive perceptions of fire science information regarding usefulness and trustworthiness. They also reported actively applying and sharing their fire science knowledge. These findings suggest that Exchanges' efforts have had impacts on both short-term outcomes (attitudes and knowledge) and medium-term outcomes (behavioral intentions and behaviors) experienced by General Public respondents.

General Public respondents were least likely to endorse the statement, *Fire science information is easy to find* (though mean responses still fell at the positive end of the scale). This suggests that Exchanges should continue efforts to increase awareness of convenient methods of obtaining fire science information among targeted General Public groups (such as private landowners). Continued development and promotion of the Exchange websites should help enhance the General Public's access to fire science information, particularly if the websites are user-friendly. Exchanges targeting members of the General Public without web access may need to consider alternate strategies to facilitate ease of accessing fire science information.

Table 14. General Public Experiences with Fire Science Information and Fire Management Issues

Item	Mean (SD)
I am interested in learning more about fire science/fire management issues	4.36 (0.77)
My awareness of fire science/fire management issues has increased during the past year	4.24 (0.71)
I plan to use what I've learned about fire science to protect my home/land/community	4.18 (0.64)
I plan to use what I've learned about fire science to protect my home/land/community	4.18 (0.64)
I have shared or discussed information that I have learned about fire science with others	4.15 (0.97)
I am concerned about the effects of fire on my environment	4.13 (1.02)
I am concerned about fire danger in my community	4.13 (1.07)
Overall, the fire science information available to me has been useful	4.11 (0.74)
The fire science information I have received seems trustworthy and credible	4.11 (0.77)
Fire science information is relevant to my needs	4.04 (0.86)
I have changed one or more of my behaviors as a result of what I have learned about fire science	3.76 (0.90)
Educational materials about fire science (fact sheets, videos and web-based) are easy to understand	3.72 (0.74)
Fire science information is easy to find	3.43 (0.80)
I'm unsure of where to go or who to contact if I have questions about fire science or fire management issues*	2.37 (0.95)

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree. *Indicates the item was negatively framed (thus lower mean values indicate *more* certainty about where to go/who to contact regarding fire science/management issues).

General Public Experiences with Fire Science Information Communication Sources

Like Consumers, General Public respondents completed a series of items about their experiences with a variety of fire science information communication sources. Specifically, they were asked to indicate the frequency with which they accessed information from seven different communication sources during the past year. In addition, they were asked to rate the usefulness of information they had received from each communication source. These responses may help Exchanges tailor their outreach and educational efforts according to community members' preferred communication sources and highlight any limitations in source accessibility.

Table 15 displays General Public mean responses to items concerning their experiences with fire science information communication sources. Also, these results are graphically depicted in Figure 13.⁴ The sources rated as most useful were often, but not always, among the most frequently accessed. For instance, the General Public respondents rated *community meetings or conferences* as the most useful source of fire science information; they also had relatively high ratings of the usefulness of *Communicating with fire management/extension professionals*. Thus, like Consumers, it appears that the General Public respondents benefit from interactive learning opportunities, though engagement in such opportunities is understandably limited by time and resource constraints.

Internet was by far the most frequently accessed source, and was rated as the third most useful source of fire science information. A follow-up survey question asked General Public respondents whether the fire science information they received from web-based sources was current and up to date. Most respondents agreed (51.1 percent) or strongly agreed (24.4 percent) that the information accessed from web-based sources was current; 13.3 percent of responses were neutral and 8.8 percent disagreed or strongly disagreed that such web-based information was current and up to date.

Table 15. General Public Mean Ratings of Fire Science Information Communication Sources: Frequency of Access and Perceived Usefulness

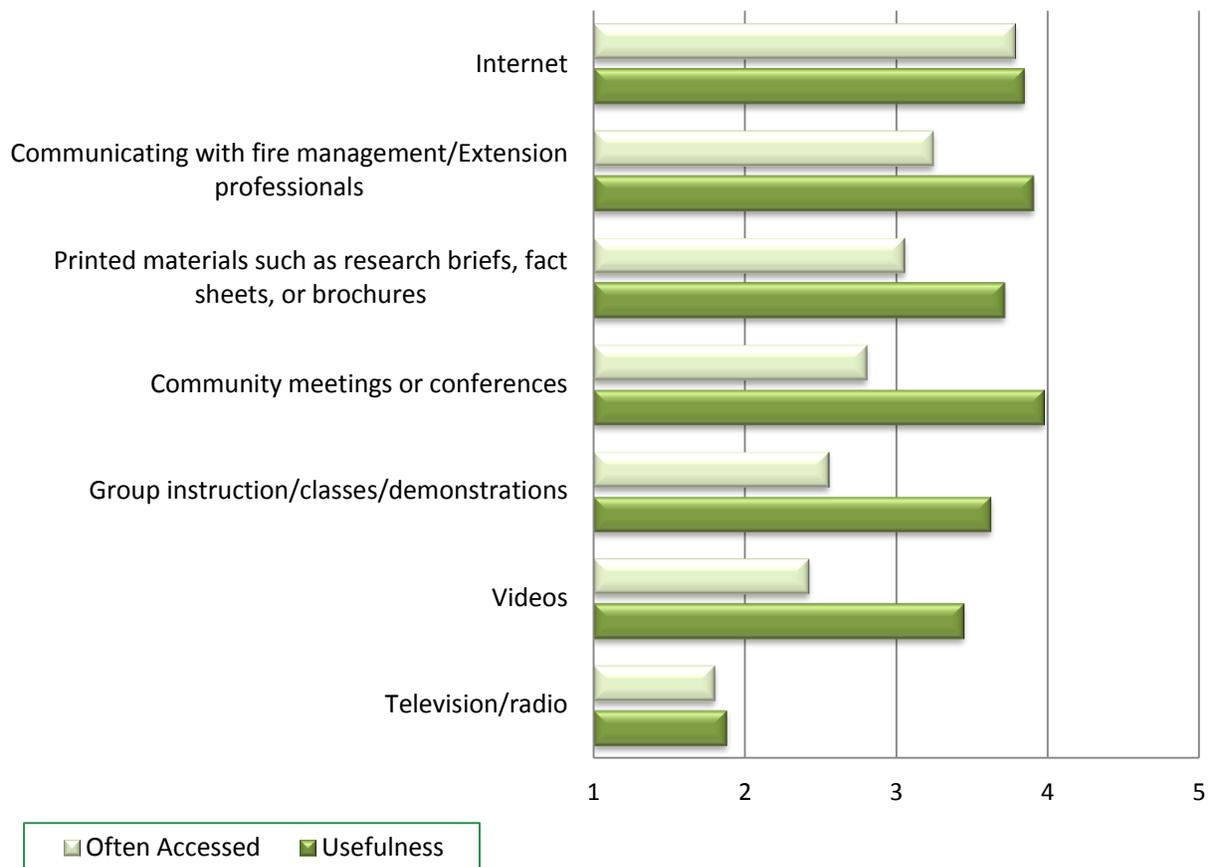
Communication Source	Usefulness Mean (SD)	Often Accessed Mean (SD)
Community meetings or conferences	3.97 (1.00)	2.80 (1.11)
Communicating with fire management/Extension professionals	3.90 (1.01)	3.24 (1.09)
Internet	3.84 (0.87)	3.78 (1.00)
Printed materials such as research briefs, fact sheets or brochures	3.71 (0.90)	3.05 (0.99)
Group instruction/classes/demonstrations	3.62 (1.26)	2.55 (1.11)
Videos	3.44 (1.11)	2.42 (1.16)
Television/radio	1.88 (0.99)	1.80 (0.82)

Note. A 5-point Likert scale was used. Often Accessed scale rated responses where 1 = Never and 5 = Very Often. Usefulness scale rated responses where 1 = Not Useful and 5 = Very Useful. Because some Consumers had little or no experience with some of these information sources (had never accessed during the past year), not all respondents provided usefulness ratings.

⁴ As some General Public Respondents were likely unfamiliar with some of the communication sources more common to Consumers (such as professional meetings/conferences and field demonstrations), they were asked about their experiences with seven different sources rather than 11 (as in the Consumer survey). Due to role differences, several communication sources presented to the General Public also differed from those presented to Consumers.

Only 2.2 percent of General Public respondents reported that they had not accessed fire science information from web-based sources. Taken together, these findings highlight the importance of Exchange websites in enhancing fire science delivery among members of this diverse group. As the vast majority of General Public respondents reported using the internet to obtain fire science information, promoting websites (and, for those Exchanges targeting the General Public, offering relevant information and resources) are conducive to increasing fire science information accessibility and application.

**Figure 13. Fire Science Information Communication Sources:
Mean Rating of How Often Accessed and Usefulness**



Note. A 5-point Likert scale was used. Often Accessed scale rated responses where 1 = Never and 5 = Very Often. Usefulness scale rated responses where 1 = Not Useful and 5 = Very Useful. Because some Consumers had little or no experience with some of these information sources (had never accessed during the past year), not all respondents provided usefulness ratings.

Trends across Survey Years

The following section presents results from the last four survey waves to explore trends of the Exchanges' efforts on perceptions of fire science information and information delivery. Mean responses to survey items from 2011-2014 are primarily presented in graphic form to facilitate interpretation of trends across the survey waves. This report does not present all of the numeric figures or "raw data" for responses to each survey item across the four waves, as this would unnecessarily lengthen the report considering the number of survey items.⁵ It also should be noted that the participation of Exchanges in the online survey varied across the years, and that aggregate results for 2012-2014 reflect Exchanges in different developmental stages, as they include responses from affiliates of both the eight original and the six additional Exchanges. Given that three years have elapsed since all Exchanges have been established, exploring trends in online survey responses across the four waves can illuminate progress at the aggregate level. This section highlights findings that may be particularly helpful in tracking success and informing future fire science delivery efforts among JFSP Exchanges.

Consumer Trends

Consumers' mean responses to items as they have been reported over the course of the four waves of the survey from 2011 to 2014 are presented below.

Experiences with Fire Science Information

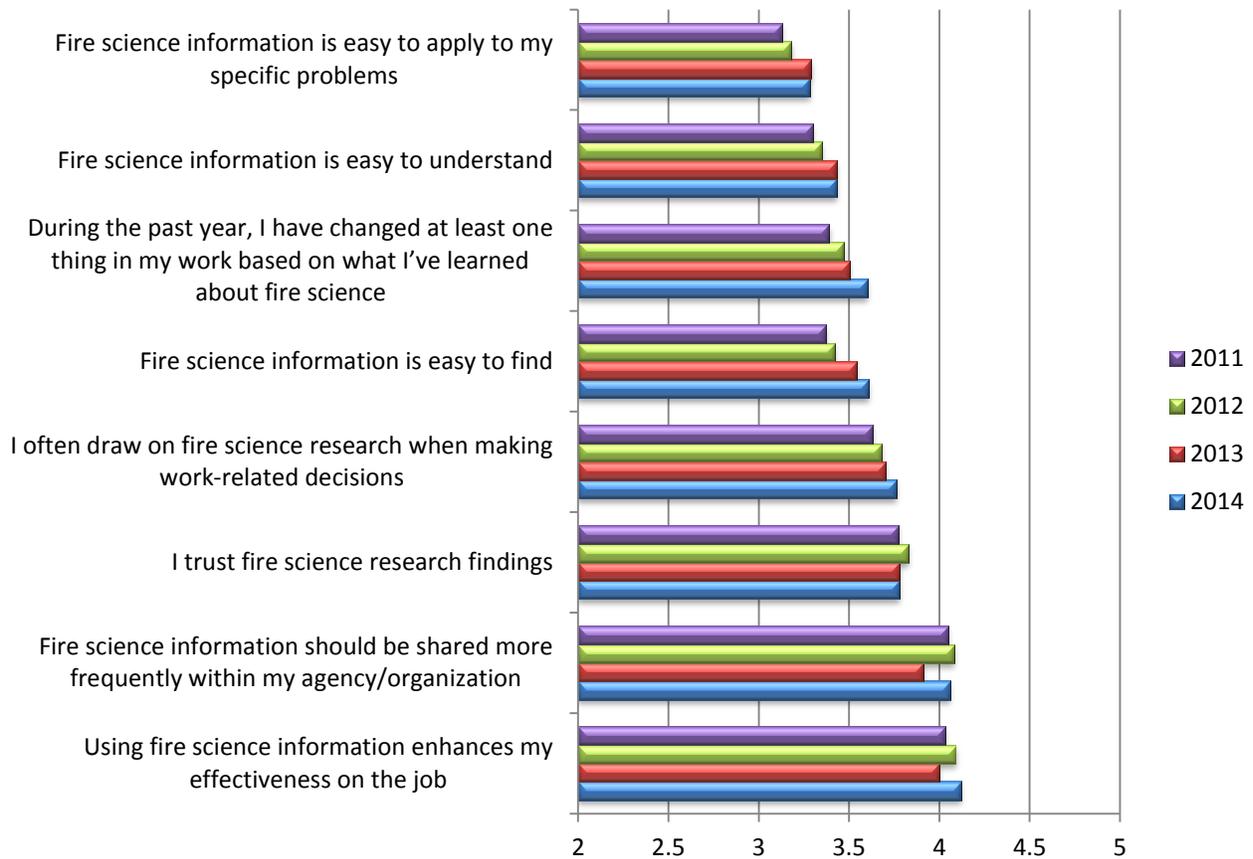
Figure 14 displays mean responses to items concerning Consumers' perceptions and experiences regarding fire science information accessibility and applicability asked in 2011 (Wave 1) through 2014 (Wave 4). Overall, Consumers reported more positive perceptions across time. For instance, Consumers were increasingly likely to agree that *Fire science information is easy to find* with each wave of survey distribution. The mean response to this item in the 2011 survey was 3.37, compared to 3.61 in the 2014 survey ("1" indicates strong disagreement; "5" indicates strong agreement). In addition, Consumers were increasingly likely to agree that, *During the past year, I have changed at least one thing in my work based on what I've learned about fire science* across survey waves. In the 2011, the mean Consumer response to this item was 3.39; in 2014, the mean response was 3.60. This improvement is particularly notable because it indicates that many Consumers are progressing beyond the awareness phase and actively applying what they have learned.

As Figure 14 illustrates, there also was an increase in the extent to which Consumers believed that *Fire science information is easy to apply to my specific problems* from the 2011 survey responses ($M = 3.13$) to the 2014 survey responses ($M = 3.28$). Consumers' perceptions regarding fire science information applicability, however, remained stagnant across 2013 and 2014 survey responses, and Consumers' agreement with this item statement was the lowest

⁵ Mean responses and standard deviations for all Consumer items included in the 2011-2014 online surveys are reported in the Evaluation Reports pertaining to each year. Please contact Lisa Maletsky at lmaletsky@unr.edu to request numeric results for specific items and specific survey waves.

compared to all other item responses in each of the four survey waves. Thus, these results indicate that application of fire science information remains a challenge for many Consumers. In addition, participants' self-reported trust in fire science research findings was nearly the same in 2011 ($M = 3.77$) and in 2014 ($M = 3.78$).

Figure 14. Consumer Perceptions Oof Fire Science Information Accessibility and Applicability from 2011 to 2014



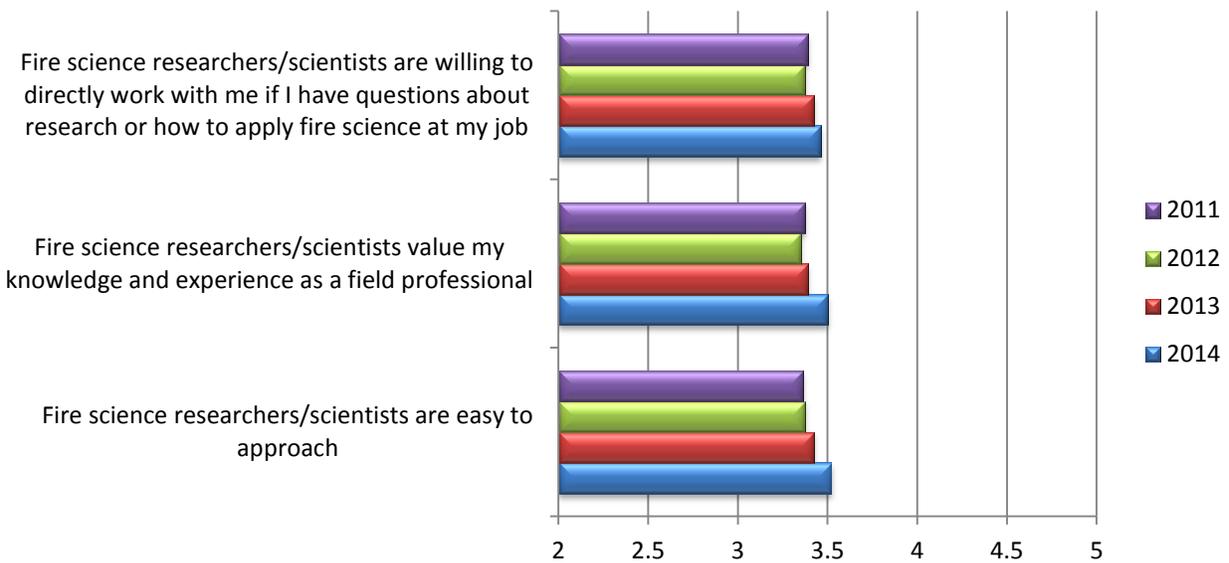
Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Perceptions and Experiences Regarding Fire Science Information Producers

Mean responses to survey items regarding Consumers' perceptions of and experiences with fire science information Producers are presented in two figures. Figure 15 displays the mean responses across survey waves for three positively framed items, and Figure 16 displays the mean responses for the additional two negatively framed items. These items are presented in a separate figure to facilitate interpretation, as higher values on the positively framed items and lower values on the negatively framed items indicate more favorable perceptions and experiences regarding Producers.

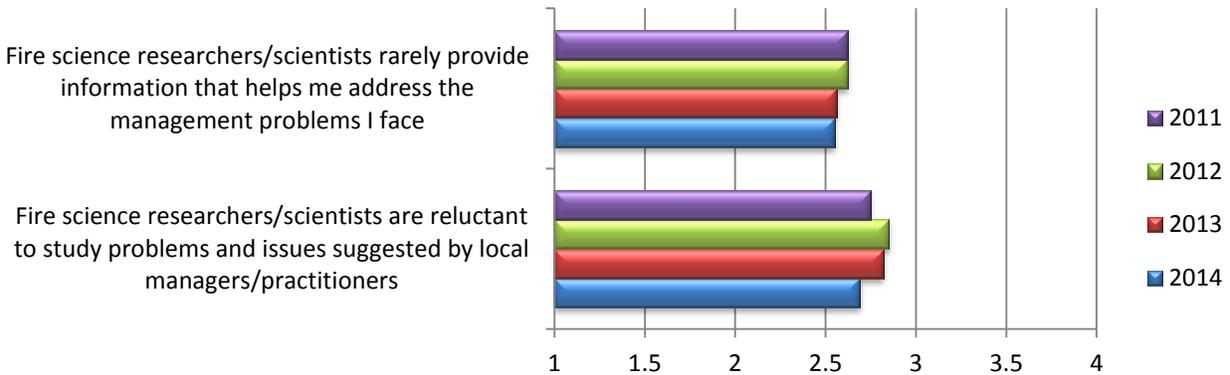
As Figures 15 and 16 show, responses to these items were less variable across years than responses to other groups of online survey items. From 2011-2013, there was little change in Consumers' beliefs regarding the extent to which Producers were willing to work with them directly and valued their knowledge and experience; there also was little change in Consumers' perceptions of Producer approachability. Survey responses to the 2014 wave, however, showed slight but positive trends towards more favorable Consumer perceptions and experiences with Producers (see Figure 15). In particular, Consumers viewed Producers as more approachable in 2014 ($M = 3.52$) than in 2011 ($M = 3.36$) and 2012 ($M = 3.37$). As indicated in Figure 16, Consumers also were less likely to believe that *Fire researchers/scientists are reluctant to study problems/issues suggested by local managers/practitioners* in 2014 ($M = 2.69$) than in 2013 ($M = 2.82$) and 2012 ($M = 2.85$).

Figure 15. Consumer Perceptions and Experiences of Producers from 2011 to 2014



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Figure 16. Negatively Framed Questions of Consumer Perceptions and Experiences of Producers from 2011 to 2014

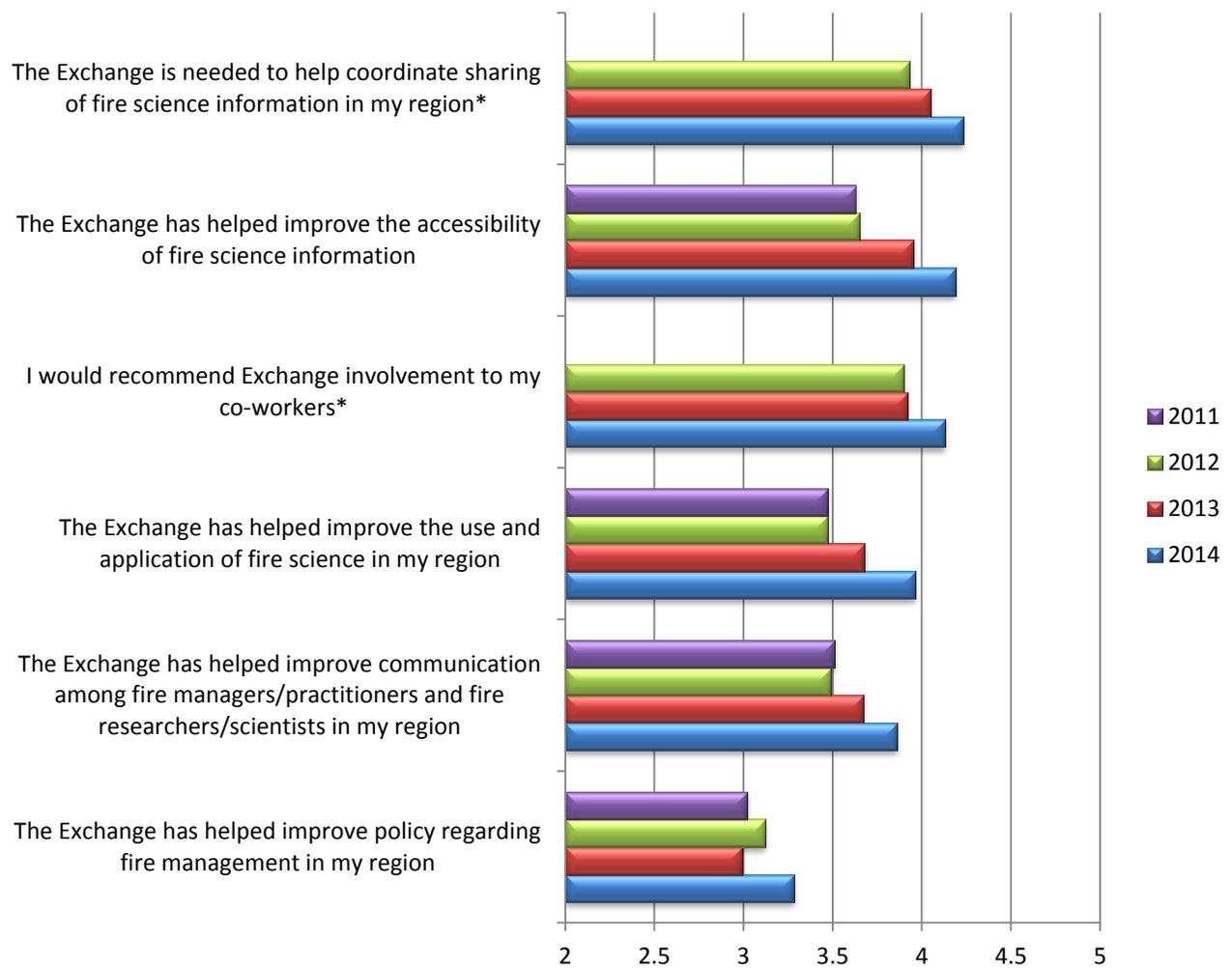


Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Opinions and Experiences Regarding Fire Science Exchanges

Figure 17 displays Consumer’s mean responses to items focusing on their opinions and experiences about their Exchange as reported from 2011 to 2014, with the exception of two questions not asked in the original JFSP evaluation survey. For most items, there was little difference in mean responses between the 2011 and 2012 survey waves. In 2013 and 2014, Consumer opinions and experiences regarding their Exchange became notably more favorable. For instance, participants were equally likely to agree that, *The exchange has helped improve the use and application of fire science in my region* in 2011 and 2012 ($M = 3.47$), but were increasingly likely to agree with this statement in 2013 ($M = 3.68$) and in 2014 ($M = 3.96$). In another positive trend, participants’ perceptions of the extent to which their Exchange *has helped improve the accessibility of fire science information* increased between 2012 ($M = 3.65$) and 2013 ($M = 3.95$), and increased again in 2014 ($M = 4.19$). The increase in Consumer opinions and experiences regarding their regional exchanges noted in the most recent survey waves (2013-2014) reflect the time it takes for individuals to become familiar with their Exchange (in terms of purpose, efforts, outreach activities) and to observe the changes resulting from Exchange programming.

Figure 17. Consumer Opinions and Experiences of their Regional Exchange from 2011 to 2014



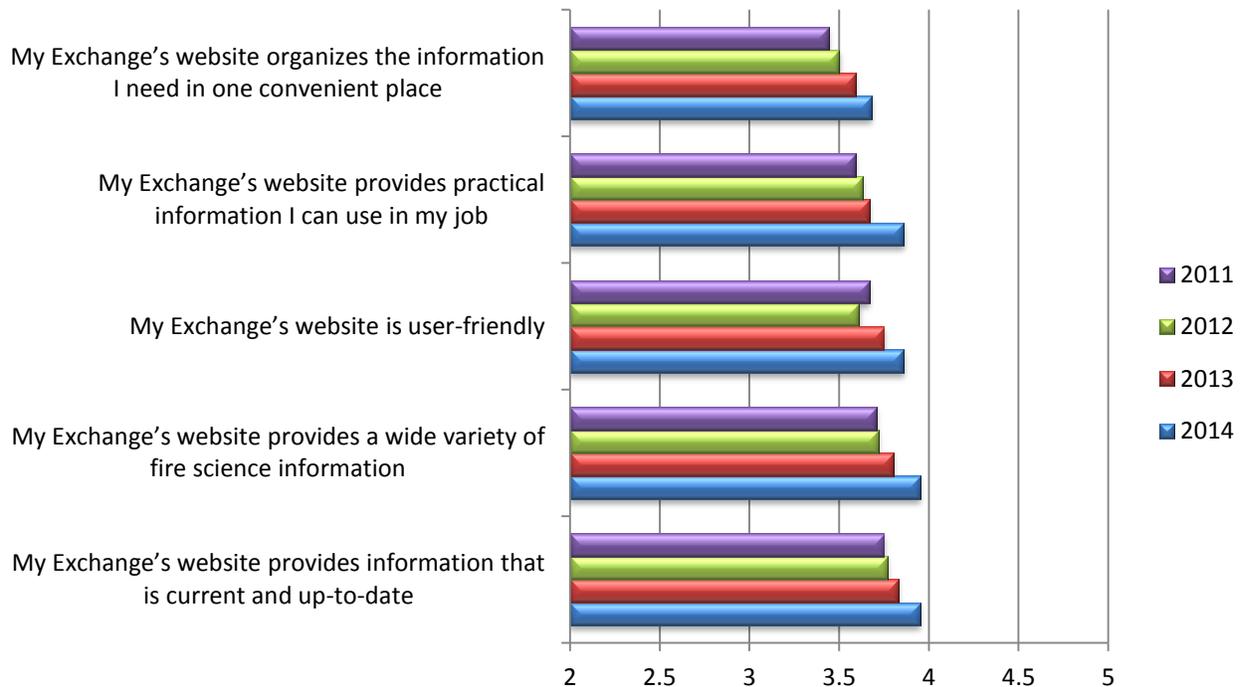
Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree. *Indicates the items did not appear on the 2011 survey and therefore no data exists for that year.

Opinions and Experiences Regarding Exchange Websites

Figure 18 displays mean responses to items targeting Consumers' opinions and experiences regarding Exchange websites obtained across survey waves. Again, only respondents who indicated that they had visited their Exchange website answered questions specific to their experiences with those websites, and Exchange websites were in varying stages of development across all survey waves. The data from 2011-2014 indicate that Consumers' opinions and experiences about their Exchange websites are becoming more favorable, with the most favorable responses occurring in the 2014 wave. Of particular interest, Consumers were more likely to agree that, *My website provides practical information that I can use in my job* in 2014 ($M = 3.86$) than in 2013 ($M = 3.67$), 2012 ($M = 3.63$) and 2011 ($M = 3.59$). As

previously noted, other survey results indicate that applicability of fire science information is an ongoing challenge for many Consumers. This positive change suggests that the information provided by Exchange websites is helping to address this challenge.

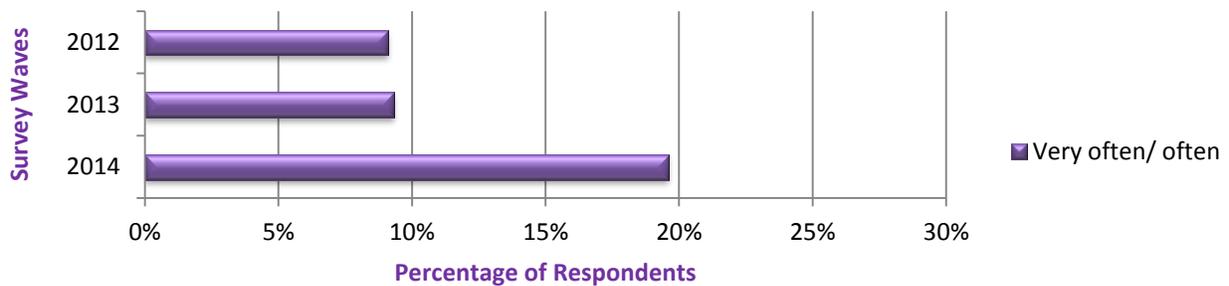
Figure 18. Consumer Opinions and Experiences of their Exchange's Website from 2011 to 2014



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

In addition, there is evidence that the increase in perceptions of the applicability of fire science information provided by Exchange websites is helping to increase the use of this information in the field. When asked, *How often did you use information obtained from your Exchange's website on the job in the past year?*, less than 10% of respondents in 2012 and 2013 indicated that they used this information *Often* or *Very often* (this question was not included in the 2011 survey). In 2014, 19.6% of Consumers reported that they *Often* or *Very often* used information obtained from their Exchange's website on the job during the past year (see Figure 19).

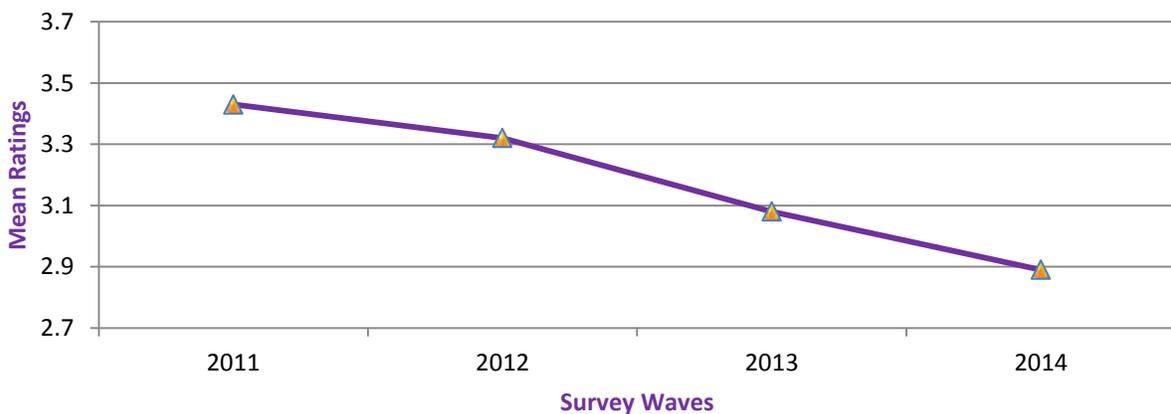
Figure 19. Percentage of Consumers Using Exchange Website Information on the Job Very Often or Often, 2012 to 2014



Obstacles Consumers Face in Accessing Fire Science Information

In all four survey waves, Consumers were asked to about the extent they believed specific items were obstacles to accessing relevant fire science information. Because of the nature of the questions, lower means over time indicate improvements in reducing obstacles. In 2011 and 2012, the item *Fire science is not available in one convenient place* was the top rated obstacle ($M = 3.43$; see Figure 20). Over the course of four survey waves however, this top obstacle dropped from first place in 2011 and 2012, to third place in 2013 ($M= 3.08$), and finally to last place in 2014 ($M = 2.89$). The finding that fire science was not conveniently located was important because it highlighted the need for Exchanges, and Exchange websites in particular, to be the “one-stop-shop” for fire science information. Decreases in the rating of this item as an obstacle may indicate the success of Exchanges to house and disseminate fire science research.

Figure 20. Consumer Responses: Fire Science Information is Not Available in One Convenient Place



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

In addition to the fire information not being in one convenient place, responses to the item *I have few opportunities to communicate with fire science researchers/scientists* also decreased over time from 2011 ($M = 3.23$) and 2012 ($M = 3.25$) to 2013 ($M = 3.04$) and 2014 ($M = 3.03$). Unfortunately, not all obstacles showed the same movement as the items above. Specifically, beliefs that lack of communication *between* and *within* agencies and organizations hindered the accessibility of fire science information stayed relatively unchanged over the course of survey waves (see Table 16). Exchanges may want to note how activities could potentially increase communication within and across relevant organizations.

Table 16. Obstacles Consumers Face in Accessing Relevant Fire Science Information, 2011 to 2014

Obstacle	2011	2012	2013	2014
Lack of communication <i>between</i> agencies and organizations in my region decreases the accessibility of fire science information	3.38	3.29	3.28	3.33
Lack of communication <i>within</i> agencies and organizations in my region decreases the accessibility of fire science information	3.26	3.21	3.17	3.23
I have few opportunities to communicate with fire scientists/researchers	3.23	3.25	3.04	3.03

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Producer Trends

Producers' mean responses to items as they have been reported over the course of the four waves of the survey from 2011 to 2014 are presented below.

Producers' Research Practices and Experiences with Consumers

Mean responses to survey items regarding Producers' research practices and experiences with fire science information Consumers are presented in Figures 21 (positively framed items) and 22 (negatively framed items). Comparisons of mean responses across survey waves did not reveal any positive trends in Producer responses. In fact, some of these responses became *less* favorable across survey waves. For instance, Producers responding to the 2014 online survey were less likely to agree that *I make an effort to present information to managers/practitioners in a way that is easy to understand* ($M = 4.41$) than Producers responding to the 2011 survey ($M = 4.57$; see Figure 21). In addition, Producers were more likely to agree that, *I am sometimes hesitant to study problems suggested by local managers in practitioners* in 2014 ($M = 2.36$) than in 2011 ($M = 2.22$). These negative trends are very small, and it is important to note that Producers' self-reported research practices and experiences with Consumers are overall largely positive across all four survey waves. The lack of positive change in Producer mean responses compared to the positive changes in Consumer responses observed across survey waves, however, does cohere with results from the qualitative interviews that were conducted with Exchange personnel in winter 2013.⁶

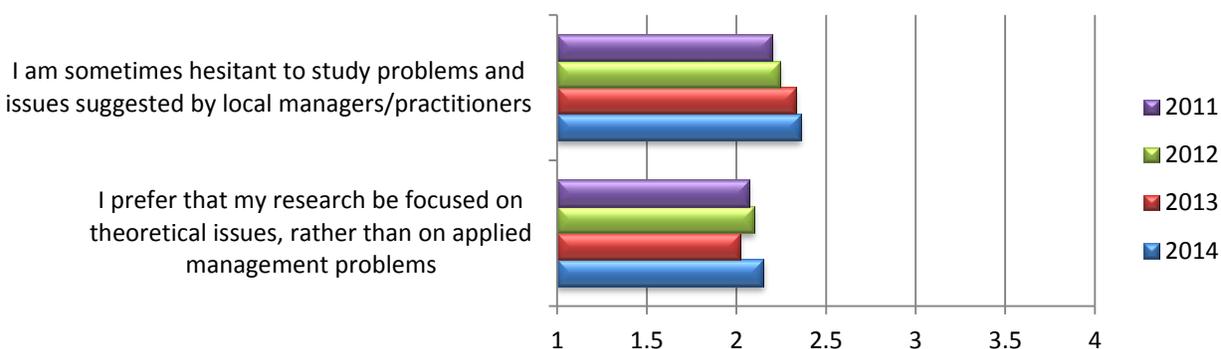
⁶ In the winter 2013 qualitative interviews, many participants highlighted challenges in building partnerships with Producers and engaging Producers in Exchange programming. These challenges may help account for the lack of positive changes in Producer responses across survey waves. Please contact Lorie Sicafuse at lsicafuse@unr.edu to request a copy of the full report, *Interviews with JSP Consortia Leadership and Staff*.

Figure 21. Producer Research Practices and Experiences with Consumers from 2011 to 2014



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree

Figure 22. Negatively Framed Questions of Producer Research Practices and Experiences of Consumers from 2011 to 2014



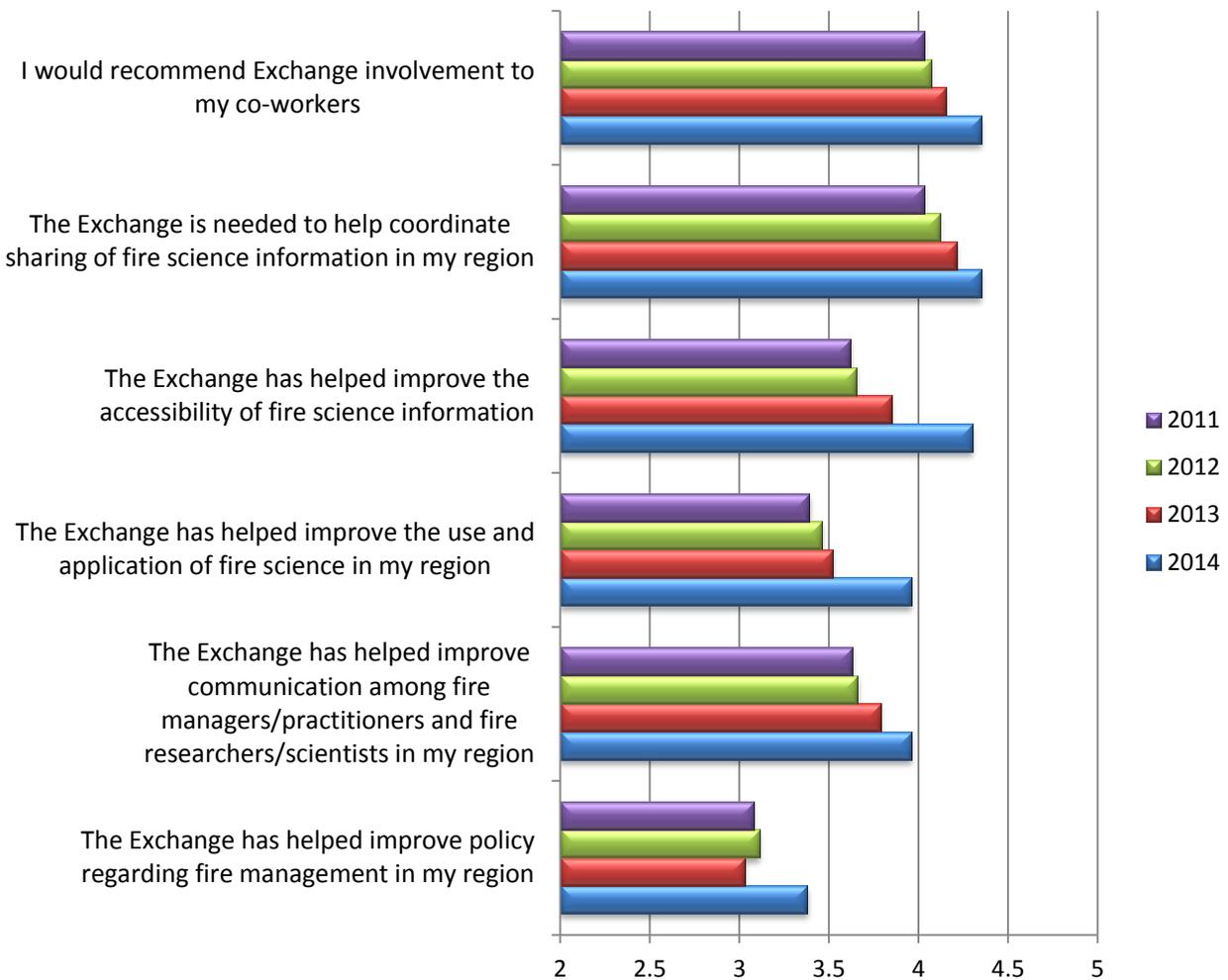
Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Opinions and Experiences Regarding Fire Science Exchanges

Though there was little change in mean responses to items regarding Producers' experiences with Consumers across survey waves, there were many positive changes in mean responses to items targeting Producers' experiences with their regional Fire Exchange. These changes were similar to those that were observed in the Consumer sample. Perceptions of the Exchanges did not differ much between 2011 and 2012, and some perceptions became more favorable in 2013. Results from the 2014 survey revealed more substantial positive trends. In fact, Producers' responses to all items in this set were the most favorable in 2014, compared to prior years. This again illustrates the time it takes for participants to become aware of Exchange programming and impacts.

The most substantial changes were in Producers' responses to items concerning the accessibility and use and application of fire science information in their region (see Figure 23). Producers were similarly likely to agree that *The Exchange has helped improve the accessibility of fire science information* in 2011 ($M = 3.62$) and 2012 ($M = 3.65$), and were slightly more likely to agree with this statement in 2012 ($M = 3.83$). There was a more notable increase in agreement with this statement in 2014 ($M = 4.03$). There were minor increases in agreement with the statement, *The Exchange has helped improve the use and application of fire science in my region* from 2011 ($M = 3.39$) to 2012 ($M = 3.46$) to 2013 ($M = 3.52$). The mean response to this item in 2014 further increased to 3.96. Changes in Consumer responses also were the most substantial for these two items. This consistency in results between survey frames strongly suggests that the Exchanges are succeeding in their efforts to improve fire science delivery increase the use of fire science information in the field.

Figure 23. Producer Opinions and Experience their Regional Exchange from 2011 to 2014



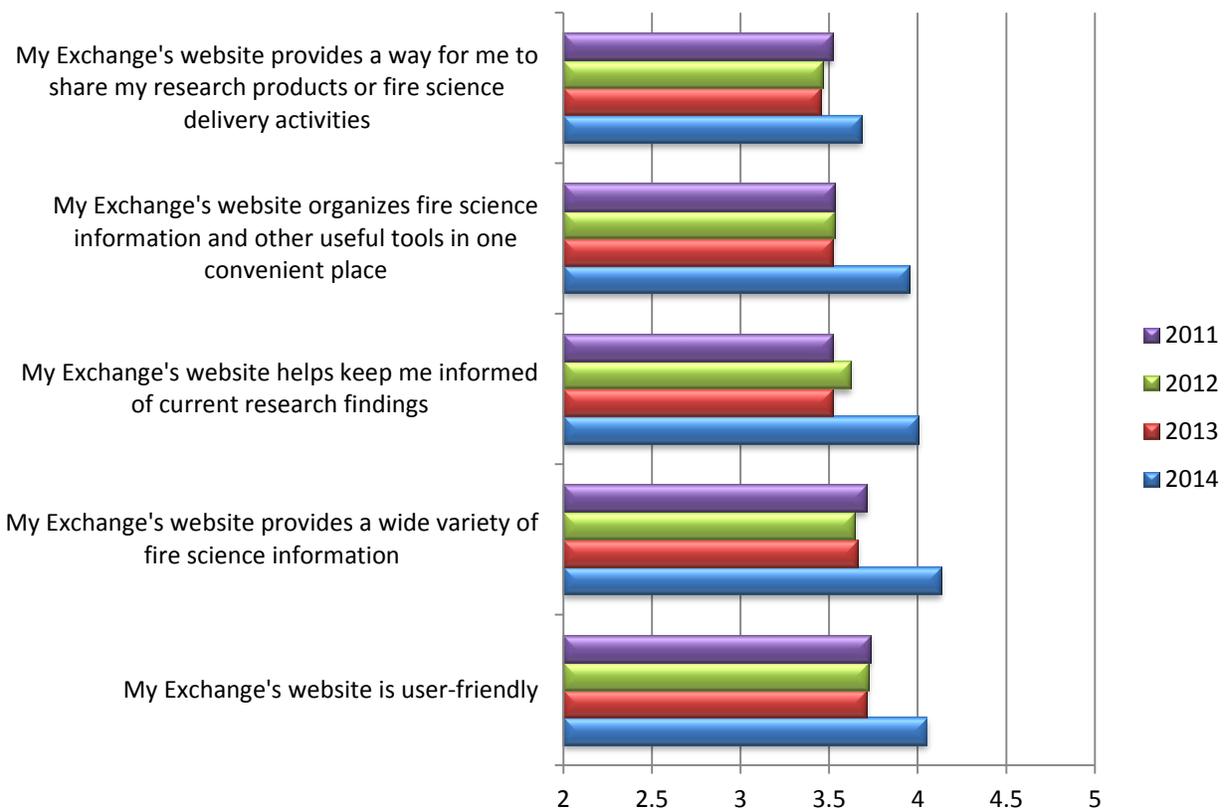
Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Opinions and Experiences Regarding Exchange Websites

Producers’ reported experiences and opinions regarding their Exchange’s website remained relatively constant throughout the first three survey waves. As Figure 24 illustrates, there was a notable increase in the favorability of responses in the 2014 sample. Responses to items concerning Exchange websites in 2014 were also the most favorable among Consumers compared to the responses obtained in prior years. Many Exchanges spent several months or even years building their websites, and have been continually improving their sites since their initial launch. This developmental process can help explain the larger increase in favorable opinions and experiences regarding Exchange sites from 2013 to 2014. Further improvements in participants’ experiences with Exchange websites are expected as many Exchanges are in the process of implementing enhanced organizational and design features.

Most Fire Exchange websites target both Consumers and Producers, but findings from prior qualitative webmetrics assessments (see *Qualitative Webmetrics Component* sections in the 2011, 2012, and 2013 Evaluation Reports⁷) indicate that, overall, the majority of Exchange website content and features targets Consumers. Yet, Producers were substantially more likely to agree that *My Exchange's website helps keep me informed of current research findings* in 2014 ($M = 4.00$) than in 2013 and 2011 ($M = 3.52$) and in 2012 ($M = 3.62$). Additionally, in 2014, 25.7% of Producers indicated that they *Very often* or *often* used information obtained from their Exchange's website on the job, compared to just 8.6% of Producers in 2012 and 9.3% of Producers on 2013 (see Figure 25). These findings suggest that Exchanges have successfully modified and expanded their websites in recent years to make their features and content more relevant to fire researchers and scientists.

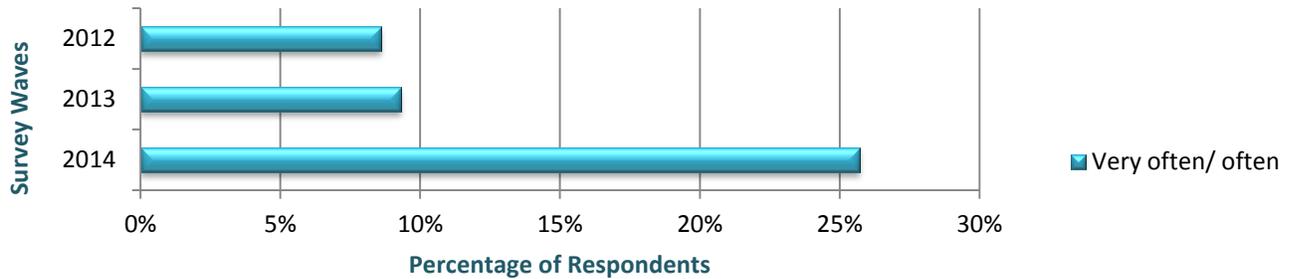
Figure 24. Producer Opinions and Experiences of their Exchange's Website from 2011 to 2014



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

⁷ Please email Lorie Sicafuse at lsicafuse@unr.edu to obtain copies of prior Evaluation Reports.

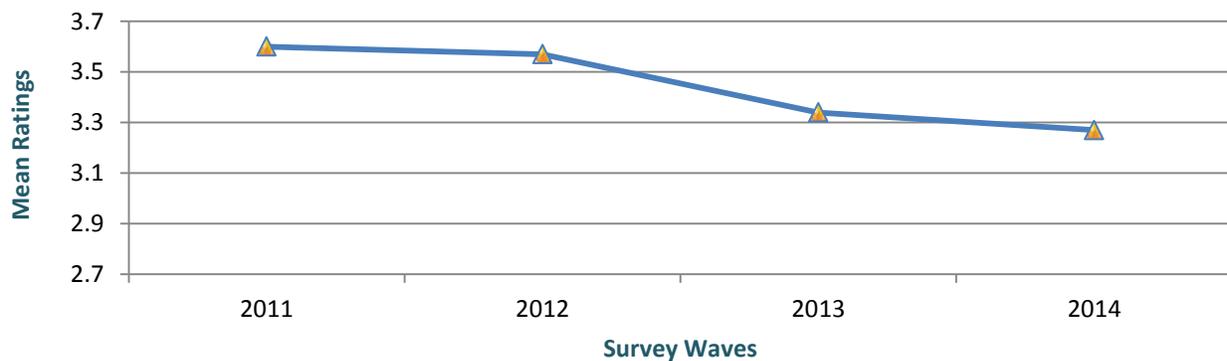
Figure 25. Percentage of Producers Using Exchange Website Information on the Job Very Often or Often, 2012 to 2014



Obstacles to Dissemination and Application of Fire Science Information

Like Consumers, Producers were less likely to agree that *Fire science information is not available in one convenient place* was an obstacle to the dissemination and application of fire science information in 2013 ($M = 3.34$) and 2014 ($M = 3.27$) than in 2011 ($M = 3.60$) and 2012 ($M = 3.57$; see Figure 26). Whereas Consumers were similarly likely to perceive lack of communication within and between agencies as an obstacle across survey waves, Producers were slightly more likely to perceive these communication issues as obstacles in every iteration of the online survey (see Table 17). In 2014, Producers were more likely to agree that *Managers/practitioners seem unreceptive or disinterested in current fire science research and information* ($M = 2.73$) than in 2011 ($M = 2.47$) and 2013 ($M = 2.61$). However, it should be noted that most Producers provided a neutral response or disagreed that this was an obstacle in all four survey waves.

Figure 26. Producer Responses: Fire Science Information is Not Available in One Convenient Place



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Table 17. Obstacles Producers Face in Dissemination or Application of Fire Science Information, 2011 to 2014

Obstacle	2011	2012	2013	2014
Lack of communication <i>between</i> agencies and organizations in my region decreases the accessibility of fire science information	3.41	3.47	3.38	3.58
Lack of communication <i>within</i> agencies and organizations in my region decreases the accessibility of fire science information	3.30	3.35	3.40	3.47
Fire scientists/researchers have few opportunities to communicate with managers/practitioners	2.86	2.97	2.79	2.84
Managers/practitioners seem unreceptive or disinterested in current fire science research and information	2.47	2.71	2.61	2.73

Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree

General Public Trends

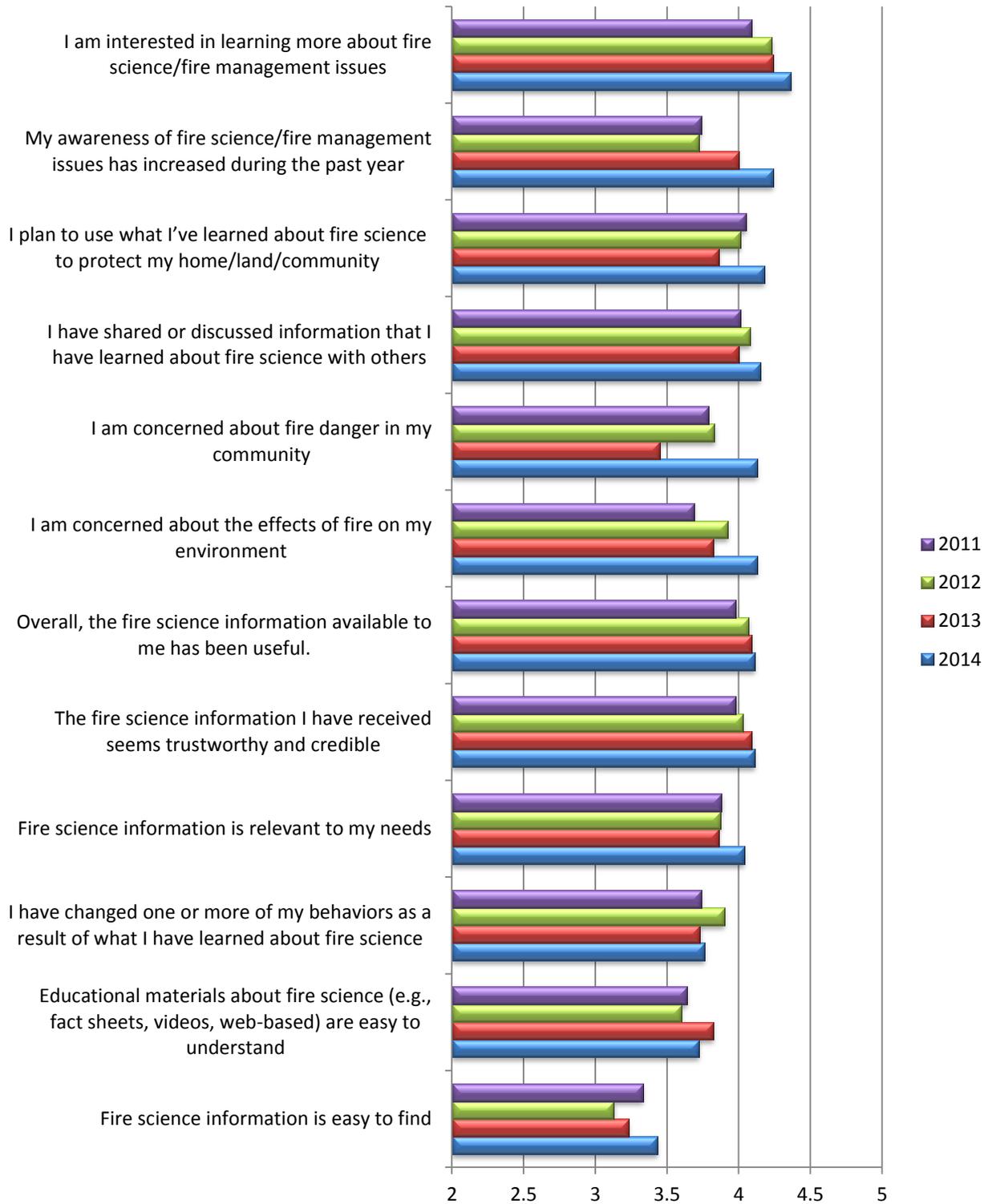
Most Exchanges have chosen to focus their efforts on Consumer and Producer populations during these initial years of development. Only a handful of Exchanges have identified members of the General Public as a target audience, and this audience represents about 10 percent of online survey respondents. Thus, the comparison samples for General Public respondents are substantially smaller than the Consumer and Producer samples across all survey waves, and there is less opportunity to detect changes given these smaller sample sizes. The General Public survey version also is much briefer than the Consumer and Producer versions. This section focuses on trends observed across survey waves in responses to the core set of General Public survey items.

Experiences and Opinions Regarding Fire Science Information and Management Issues

Mean responses to survey items regarding General Public experiences and opinions regarding fire science information and management issues are presented in Figures 27 (positively framed items) and 28 (negatively framed items). Despite the smaller sample sizes, findings do reveal some positive changes in the General Public sample, particularly with respect to the 2014 sample in comparison to prior years. The largest change was in participants' agreement that *My awareness of fire science/fire management issues has increased during the past year*. Agreement with this statement was substantially higher in 2014 ($M = 4.24$) than in 2013 ($M = 4.00$), 2012 ($M = 3.72$) and 2011 ($M = 3.74$). Participants also expressed greater concern regarding fire-related dangers in 2014 than in prior years, perhaps due to this increased awareness of fire science/fire management issues. In 2014, participants indicated that they were more concerned about *fire danger in my community* ($M = 4.13$) than in 2013 ($M = 3.45$) 2012 ($M = 3.83$) and 2011 ($M = 3.79$); they also were more concerned about *the effects of fire on the environment* in 2014 ($M = 4.12$) than in prior years (2013 $M = 3.82$; 2012 $M = 3.92$; 2011 $M = 3.69$).

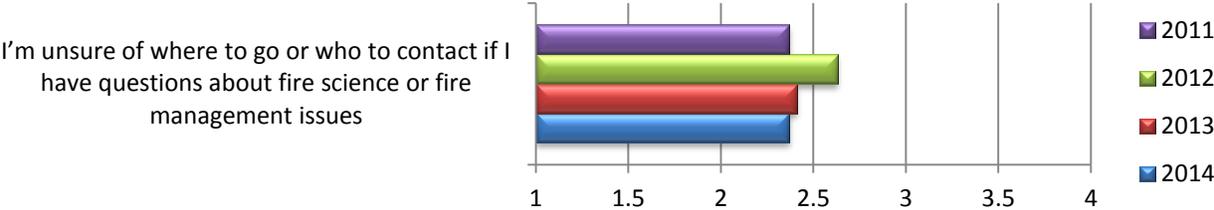
This increase in awareness is impressive; however, data indicate slower changes in the application of fire science information among the General Public. Specifically, from 2011 to 2014 there were negligible increases in agreement with the statements that *I plan to use fire science to protect my home/land/community* (2011 $M = 4.05$; 2014 $M = 4.18$) and *I have changed one or more of my behaviors as a result of what I've learned about fire science* (2011 $M = 3.74$; 2014 $M = 3.76$). It should be noted that although most participants agreed that that they found available fire science information to be useful and credible, these perceptions did not change much across the four survey waves. Perhaps more in-person and hands-on instruction is needed to help members of the General Public successfully apply what they have learned about fire science.

Figure 27. Mean Trends in General Public Experiences with Fire Science Information from 2011 to 2014



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Figure 28. Mean Trends for Negatively Framed Question about Fire Science Information



Note. A 5-point Likert scale was used where 1 = Strongly Disagree and 5 = Strongly Agree.

Online Survey Component: Summary and Implications

There are two main purposes of the online survey. The first is to obtain an understanding of the most current perspectives of Consumer, Producer, and General Public groups on the state of fire science delivery in their region and the impacts of their regional Fire Exchange. The second is to assess the impacts of Fire Exchange efforts over time, which includes identifying strengths as well as areas for improvement. This summary discusses the implications of findings from both the most current (2014) survey wave as well as the response trends emerging across time for Consumer, Producer, and General Public groups.

Consumer Perspectives

As in prior years, Consumers participating in the 2014 online survey generally reported positive experiences with fire science information, and believed that their regional Fire Exchange was making a difference in terms of increasing fire science information accessibility and applicability. They held their regional Fire Exchange in high regard, with most participants agreeing or strongly agreeing that their Exchange was needed to help improve fire science delivery in their region and that they would recommend Exchange involvement to their co-workers. Perceptions regarding the accessibility and applicability of fire science information in general, and about the contributions of their regional Fire Exchange to fire science information accessibility and applicability in particular, increased across survey waves. Overall, Consumers' experiences and opinions regarding their Exchange's website also become more favorable over time, with participants increasingly likely to agree that their Exchange's site provided a wide variety of information that was relevant to their needs. Most significantly, participants were increasingly likely to report that they had used fire science information in their work (with this information obtained via the internet and through other sources) across survey waves. These findings indicate that the Fire Exchange's efforts have not only impacted knowledge/awareness, but also behaviors.

Findings do indicate, however, that the Fire Exchanges may wish to direct their efforts towards enhancing the application of fire science information among Consumers. Though the Exchanges have indeed promoted the use of fire science information, there is still room for improvement. Consumer participants in the 2014 survey wave were least likely to agree with the statement that Fire science information is easy to apply to my specific problems compared to any other statement regarding opinions and experiences with fire science information, though responses to this item have also become slightly more favorable over time.

As in prior survey waves, Consumers participating in the 2014 survey tended to prefer interactive learning opportunities (e.g., in-person trainings, field tours and demonstrations) to more independent, passive learning opportunities (e.g., reading research summaries, journal articles), although they also indicated a strong preference for web-based learning opportunities such as webinars. Though interactive learning opportunities were rated as the most useful by Consumers, they also were among the least frequently accessed. This lower frequency of access compared to less resource-intensive learning opportunities is understandable; however, it

remains critical for the Fire Exchanges to continue to promote and sponsor interactive learning opportunities as much as possible. In doing so, the Fire Exchanges may wish to simultaneously modify their programming to incorporate more education and technical assistance regarding sharing fire science research results and tools within and between agencies. Lack of communication both within and between agencies were rated as top obstacles to the application and dissemination of fire science information in the 2014 survey, and no positive changes regarding these perceptions have emerged across survey waves. Ideally, Exchanges could develop interactive learning events designed to facilitate the application of fire science among attendees as well as train or encourage these attendees to instruct their colleagues to apply this knowledge in the field.

Producer Perspectives

Results from the most recent survey wave reveal that Producers, like Consumers, are experiencing the positive impacts of Exchange programming. Moreover, Producer respondents in the 2014 sample had the most favorable impressions of Exchange impacts than Producer samples in all other survey years. Not only were 2014 respondents more likely to agree that the Exchanges have improved the accessibility of fire science information, but they also were more likely to agree that the Exchanges have improved application of fire science information as well as policy decisions in their region.

Findings also suggest that Exchange websites are becoming more relevant to Producer audiences. Less than 10 percent of Producer respondents reported using information obtained from their Exchange websites on the job often or very often in 2012 and 2013; in 2014, more than 25 percent of Producers reported doing so. Like Consumers, Producers were less likely to cite the lack of coordination/consolidation of fire science information in one convenient place across survey waves as a challenge, and equally or slightly more likely to cite lack of communication both within and between agencies as an obstacle to fire science delivery.

Overall, Producers participating in the 2014 survey had positive perceptions of Consumers. In addition, Producers believed that helping Consumers address issues in the field was an integral part of their work. Producers' perceptions of Consumers tended to be more positive than Consumers' perceptions of Producers (although Consumer perceptions of Producers still were generally positive). Consumers rated Producers as less approachable than Producers rated themselves. Nearly all Producer respondents indicated that they would like to work on a research/management project with a fire manager/practitioner, whereas a little over three-quarters of Consumers indicated that they would like to work with a researcher/scientist on such projects. Similar discrepancies between Consumer and Producer perceptions and experiences with one another have emerged in all prior survey waves.

Though Producer responses regarding their experiences with Consumers and research practices were favorable in 2014, comparisons across survey waves revealed no positive changes in these item responses across time. As previously mentioned, this may be due to some difficulties Exchanges may be experiencing in engaging Producers in their programming. The perception among some Consumers that Producers are "intimidating" and not truly interested in

addressing applied fire management issues also may account for the stagnant Producer responses regarding their research practices and experiences with Consumers across the years. These findings suggest that the Exchanges should continue their efforts in promoting collaboration between Consumers and Producers, and in particular offering opportunities for face-to-face communication between these two groups. Building relationships and trust can take time, especially in regions where there are substantial differences in Producer and Consumer culture and perspectives. The successes Exchanges have already experienced in fostering relationships between Consumers and Producers are impressive; some of these success stories and strategies are described in the Interviews with Consortia Leadership and Staff report.

General Public

In all of the online survey waves, General Public respondents have reported generally favorable opinions and experiences regarding fire science information and management issues. These responses, however, were even more positive in 2014. For the majority of General Public survey items, mean responses in 2014 were more favorable than those obtained from any prior survey wave. The 2014 General Public sample expressed strong interest in learning more about fire science and management issues and intentions to apply such knowledge in their work or on their land. Current results did suggest that some General Public respondents continued to experience challenges in accessing and understanding and/or digesting fire science information. Further, across survey waves, there were no consistent trends in the extent to which General Public respondents reported that they had actually used fire science information they had acquired.

Although only a few Exchanges have explicitly identified the General Public as a target audience, several others have expressed interest in expanding their programming to encompass community members. Because the General Public audience is so broad, it is important for these Exchanges to determine the specific sub-groups they wish to impact via their programming, and to assess fire science/management needs and preferred delivery methods within these sub-groups. Some Exchanges (typically those who expressed intentions to target the General Public in their early developmental phases) have been quite engaged in assessing the needs of General Public audiences and developing useful, relevant products for these audiences. Fire Exchanges planning to target the General Public but have not yet incorporated the public into their programming should consider corresponding with Exchanges that have been successfully reaching Public audiences to learn more about their successes, strategies, and challenges in this area. It should be emphasized that, across multiple General Public subgroups, in-person, interactive learning opportunities appear to be the preferred method for learning about fire science and management.

Some Exchange representatives have expressed concern about using Exchange websites or other web-based resources to promote fire science delivery among some General Public sub-groups, as these sub-groups reportedly do not often use the Internet. Though General Public respondents to the national online evaluation survey cite web-based sources as one of their top preferred fire science information sources, these responses are of course subject to bias, as

only respondents who use the internet will be included in the web-based survey sample. Exchanges may consider providing website demonstrations at interactive learning events for members of the General Public that familiarize attendees with website navigation and the information on the sites that may be useful to them. This in turn could help increase use among constituents who have access to the internet but are not as “Internet savvy” as most Consumers or Producers. Media outlets may also be a valuable resource for reaching the public.

Webmetrics Component

The Exchange websites are perhaps the primary means of increasing fire science information accessibility and applicability among Consumers, Producers and the General Public. These websites serve as a convenient “one-stop shop” for practical fire science information, aim to engage the fire community through interactive online features, and notify users of learning and funding opportunities.

The webmetrics component of the current evaluation includes both quantitative and qualitative assessments. The quantitative piece involves collection and analysis of common website analytics or indicators regarding website visits and utilization. Quantitative webmetrics data included in the following section were collected from October 2013 to September 2014. The qualitative piece focuses on the operation and purpose of Exchange websites and Exchange social media accounts from the perspective of those most responsible for their Exchange’s website. The qualitative webmetrics data were collected via an online survey in August 2014. During this time, an outside website template creation project was co-occurring and leaders of that project asked Exchange representatives website questions similar to those normally asked in the qualitative survey. In an effort to reduce participant fatigue, the evaluation team did not duplicate these questions in the current qualitative survey. Therefore, data from this outside project will be described in the current report when applicable.

In addition, Wave 3 and Wave 4 of both webmetrics assessments are the first waves to feature the same thirteen reporting Exchanges. Therefore, Wave 4 will be compared to Wave 3 when comparisons can shed light on website user trends. Upon collecting more standardized and consistent future data, the evaluation team can conduct comparisons and trend analyses with the intent of: 1) assessing basic impacts of Exchange websites regarding the dissemination of fire science research results and tools; 2) illuminating best practices and features of effective Exchange websites; and 3) addressing any challenges to the successful dissemination of current, practical and synthesized information via Exchange websites.

Quantitative Webmetrics Component

All JFSP Exchanges embed an appropriate analytics package (such as Google Analytics) to collect monthly data pertaining to individual website users and patterns of utilization. Exchanges are tasked with reporting these monthly data to the evaluation team bi-annually through the use of an Excel template specifying the quantitative indicators of interest.

In Wave 1 and Wave 2, the collection period for webmetrics data was only six months. In Wave 3, the collection period was expanded to nine months to align with the fiscal year. Currently in Wave 4, thirteen Exchanges with established websites submitted complete data for the two reporting periods (October 2013 - March 2014 and April 2014 - September 2014). Only two Exchanges of the fifteen were excluded from analyses: one new Exchange without a website and one established Exchange with a compromised website address. Recent efforts to move towards a website template, however, should help support all Exchanges in future reporting. When appropriate, limited findings from previous waves will be cited for comparative purposes. As with findings from the other national evaluation components, quantitative webmetrics

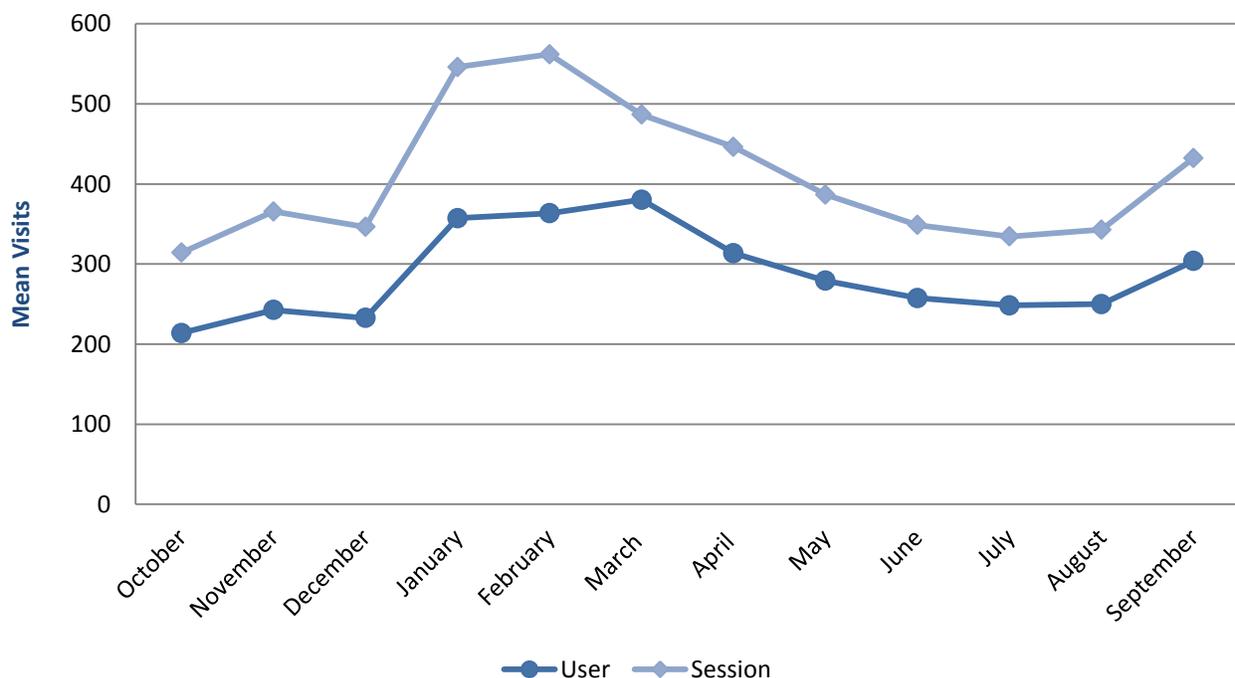
results are presented at the aggregate level. Yet, the uniqueness of each Exchange does have implications for website evaluation, which will be discussed further in the *Top Content* subsection.

Basic Website User Data

All Exchanges with established websites were asked to report the number of website *sessions* and *users* from October 2013 to September 2014. Total number of sessions provides a raw count of instances in which the website was accessed during a one-month period, whereas the number of users provides a count of unduplicated visitors to the website. To illustrate this point, an individual visiting an Exchange website five times during a particular month would be counted only once as a user, but all five website visits would be counted under total of sessions. Total number of sessions indicates the general frequency with which the websites are being accessed, whereas the number of users indicates the extent to which the Exchange websites are recruiting different visitors.

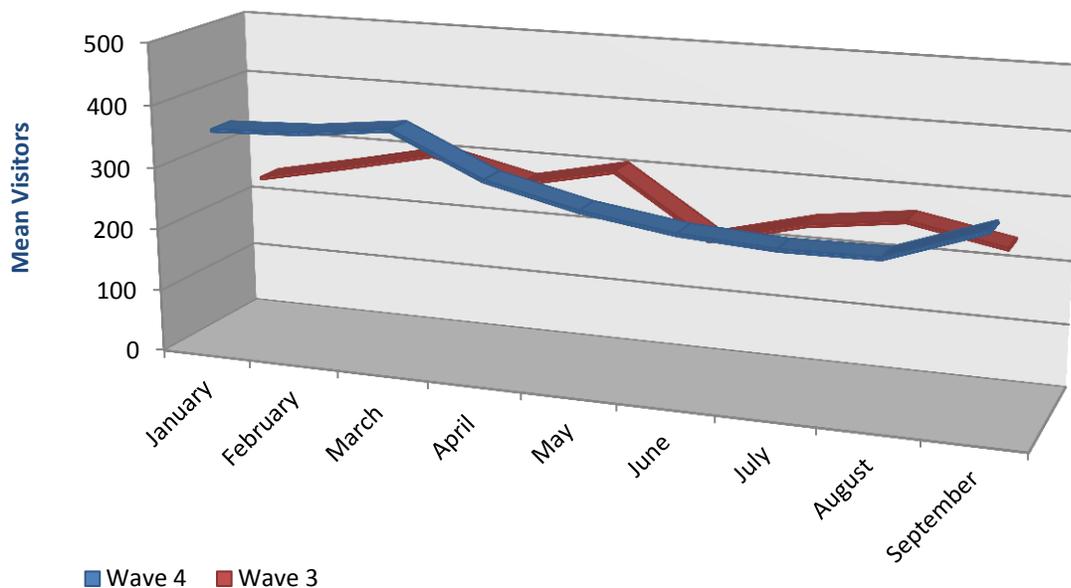
The mean session and user visits to Exchange websites from October 2013 to September 2014 are depicted in Figure 29. Similar to Wave 3, users and sessions peaked during the winter months and dropped off during warmer periods (presumably, these fluctuations are due to the differing fire demands throughout the year). Exchanges may want to note the timing of traffic increases when planning targeted highlights or modifications of website content. Standard deviations of the mean ranged from 169 to 413 for sessions visits and 122 to 281 for user visits for all months. Although these ranges are quite large, this is expected considering the diversity of Exchanges in terms of website development and regional users' needs.

Figure 29. Mean Session and User Visits per Month, October 2013 to September 2014



In Wave 3, website traffic stabilized significantly across the year when compared to the erratic pattern of website traffic found in Waves 1 and 2. However, Waves 1 and 2 showed a general trend of increased website traffic in the winter months and decreased website traffic in the summer months, likely due to the demands of fire season. Wave 3 deviated from this previously observed seasonal pattern and showed an increase in website traffic during the spring months. When Wave 4 unique users are compared to users from Wave 3, the stabilizing of website traffic flow throughout the year is even more apparent, however, the pattern of increases and decreases of website traffic based on winter and summer months has returned to previous patterns (see Figure 30). The reason behind the deviation in visitation patterns for Wave 3 is uncertain. Based on the general pattern found in website traffic in Waves 1, 2, and 4, Exchanges may want to plan website content appropriately: perhaps highlighting important content in cold months during heavy traffic and bringing new content online during warm months to encourage website visits.

Figure 30. Mean User Visits for Wave 3 and Wave 4



Exchanges also were asked to report monthly *bounce rates*, which indicate the percentage of website visitors who did not further explore the website upon accessing the home page. As website layout and features differ among Exchanges, however, bounce rates may have varying implications. Higher bounce rates may indicate that website content and features are not relevant to users, the website design is confusing and difficult to navigate, or that information is simply accessible on the home page. For instance, some visitors may be searching for information located within their Exchange website's home page and subsequently exit the website. Such instances would not be indicative of user dissatisfaction or of the Exchange websites' failure to deliver relevant fire science information.

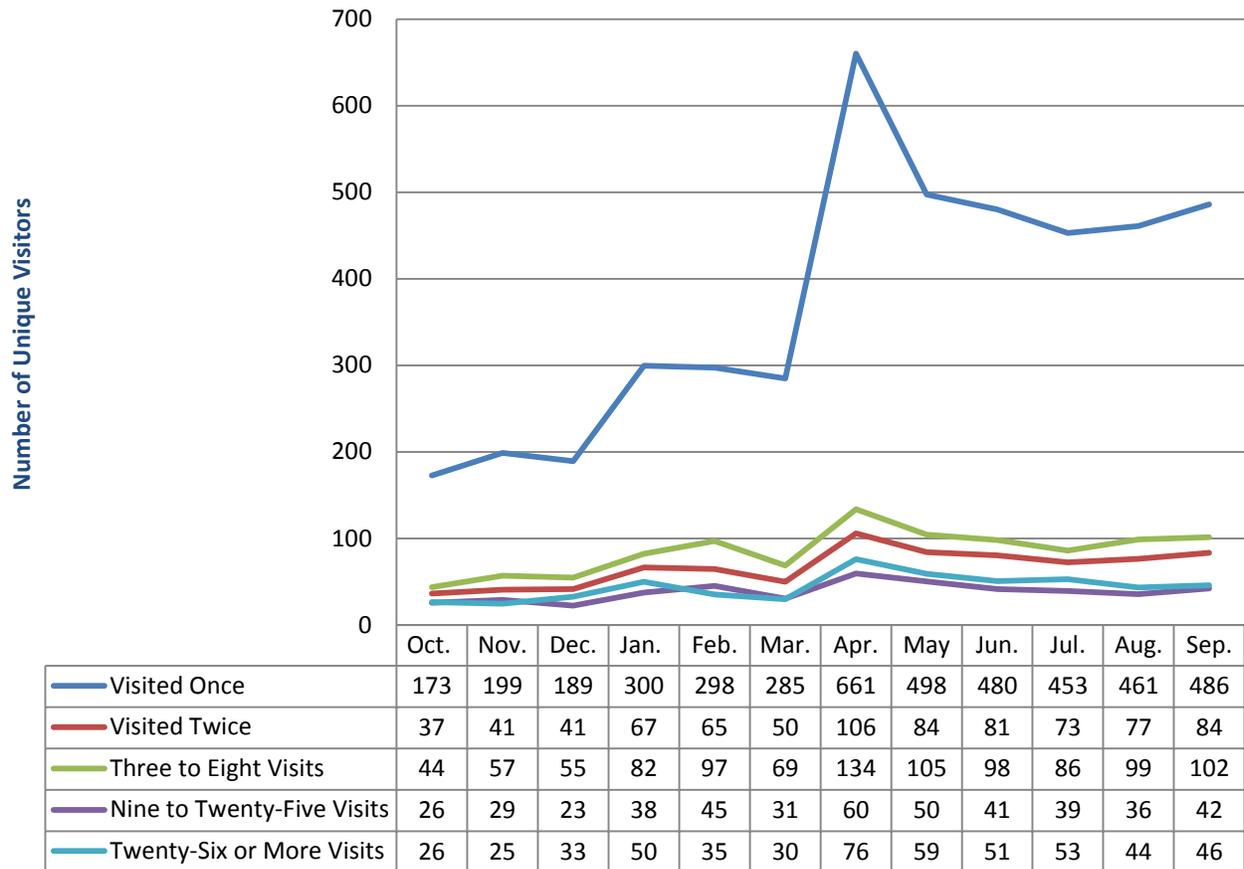
For Wave 4, the mean bounce rate aggregated across the months of October 2013 to September 2014 was 46.96 percent (SD = 20.35, $n = 13$). The bounce rate in Wave 4 was slightly higher than the mean bounce rate in Wave 3 (aggregated across the months of January 2013 to September 2013) of 43.51 percent (SD = 22.97, $n = 12$). Although a higher bounce rate may initially seem disappointing, the aggregated mean difference between Waves was not found to be statistically significant upon conducting a paired t-test ($t(9) = .18, p = .86$). Therefore, it is likely that bounce rates are stabilizing overtime just as visitor rates are stabilizing, indicating more consistent traffic.

Visitor Loyalty

Data also were collected to obtain an understanding of visitor loyalty to the Exchange websites. The extent of visitor loyalty is determined by the number of times that the same user accessed a website over a specified time period. High visitor loyalty (increased number of subsequent visits) indicates that users are engaged and satisfied with website content; in essence, visitor loyalty is a measure of user retention.

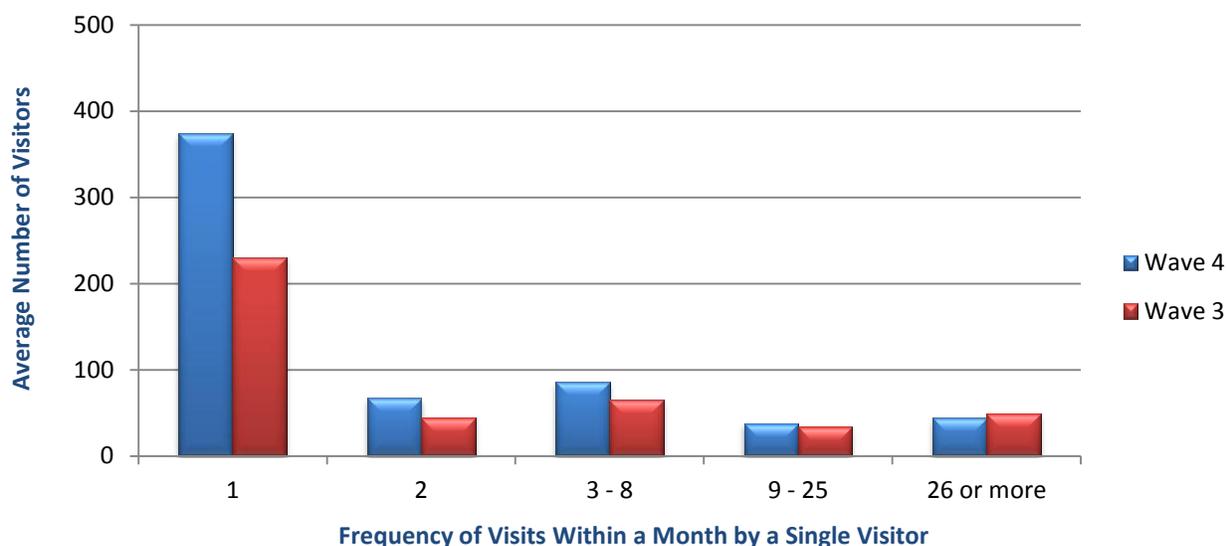
Figure 31a displays the aggregated visitor loyalty means for the months of October 2013 to September 2014. As with previous waves, most unique users visited Exchange websites only once. The peak in visits across all visiting categories occurred in the month of April. For reoccurring users within a single month, most revisited their Exchange's website three to eight times.

Figure 31a. Visitor Loyalty Means for October 2013 to September 2014



In Wave 3 and Wave 4, 13 Exchanges reported visitor loyalty; thus means compared across these waves display data from the same Exchanges (see Figure 31b). A comparison of visitor loyalty in Wave 3 and Wave 4 show that visits to Exchange websites have increased overall. The following data suggest that Exchanges are increasing the reach of their websites as more unique users visit. The large number of first-time visitors, with a sharp decline for the number of reoccurring visits, could be due to an unintentional website visit, the user’s need being satisfied by a single visit per month, or user dissatisfaction. Unfortunately, the data do not indicate the reason for a single visit. Exchanges may want to concentrate on user retention to increase repeat visits.

Figure 31b. Mean Loyalty Visits for Wave 3 and Wave 4

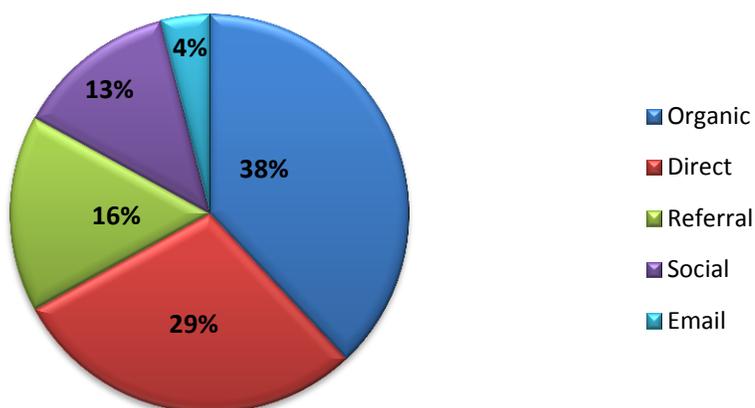


Traffic Sources

In order to provide one-stop shopping and ultimately enhance fire science delivery, it is imperative that potential users are able to easily locate and access the JFSP Exchange websites. To better understand how users encountered their Exchange website, data were collected regarding the top website traffic sources resulting in Exchange website visits.

Traffic sources refers to the specific web-based mechanisms that subsequently directed visitors to the Exchange websites. For instance, individuals may use a search engine such as Google to locate Exchange websites or they may access their individual Exchange website via a link posted on another fire science website. Figure 32 displays the breakdown of percentages for five general traffic sources that resulted in Exchange website visits. *Organic* refers to the percentage of visitors who used unpaid links (non-advertisement links) found through search engines (like Google, Yahoo, Bing, etc.) to reach Exchange websites. *Direct* refers to the percentage of users who accessed Exchange websites by directly typing the website's address into their Web browser (or accessed the website address via browser history). *Referral* encompasses all other websites and domains with a link that ultimately directed the user to the particular Exchange website. *Social* refers to specific traffic from a specified social media site and *Email* refers to specific traffic from emailed links (like mailchimp).

Figure 32. Traffic Sources



New to Wave 4, Organic access was the most common traffic source (compared to previous waves in which Direct access was the most common traffic source). This finding is encouraging because it indicates possible outreach to new users who are utilizing search engines to find fire science information or Exchanges. Direct access fell to second most common traffic source in Wave 4. In addition, Referral access decreased when compared to other waves; however, this was likely due to the separate accounting of Social and Email referrals (which was new to Wave 4). Overall, it appears that Exchanges are improving website traffic outreach and should continue to try to partner with other fire science websites to share links and recruit new users.

Exchanges also were asked to indicate their top three *specific* traffic sources for each month. These data were entered as text (web addresses and phrases), so numeric analyses were not conducted in this category. A basic review of these data illuminates the most common types of general traffic sources used to access the websites. Similar to Wave 3, those ultimately arriving at Exchange websites using searches overwhelmingly used the Google search engine. The majority of referrals originated from the JFSP home site (firescience.gov) and FRAMES, though cross-Exchange links and university-based links also generated web traffic. Finally, links embedded in mailchimp announcements, listserv emails and social networking sites often appeared among the top three specific traffic sources.

Top Website Content

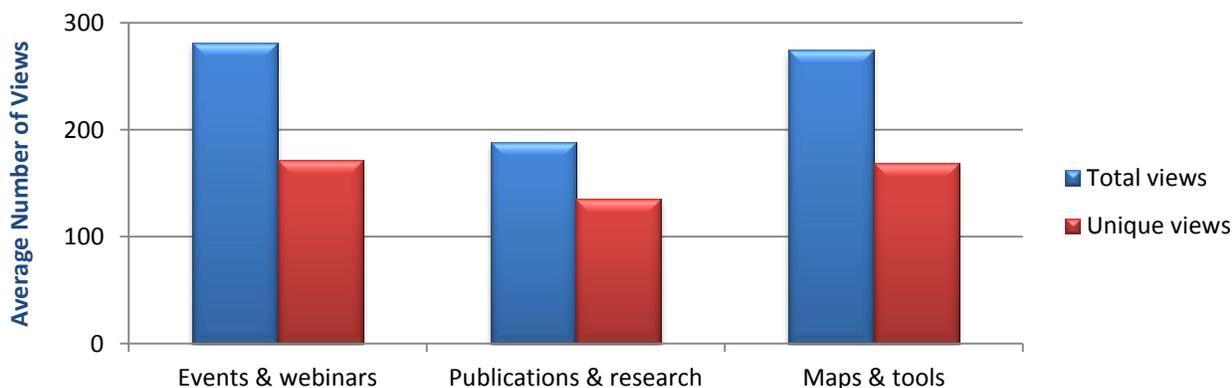
One objective of the quantitative webmetrics component is to examine the popularity of website content in order to assess the degree to which specific website features and content are meeting users' needs. This information may be used to inform further website development, modification and expansion. Yet, as stated in all previous reports, the differential organization of each individual Exchange website has created real challenges to reliably identifying top website content.

Therefore, it was very exciting that in 2014 JFSP decided to pursue a website template creation project to standardize website organization across all Exchanges. The new template (in the

process of being implemented) contains three main organizing frames that will be used in this report to describe top content: 1) Events and webinars, 2) Publications and research, and 3) Maps and tools. The events and webinars section contains information on field tours, conferences, and webinars. The publication and research section contains a wide range of information from fact sheets, white papers, online courses, newsletters, lessons learned materials, book chapters, academic posters and dissertations. Finally, the maps and tools section contains management and planning documents (like contact information and Exchange goals), as well as models and technology information for direct application. This new organizing framework should allow each Exchange to customize content, while allowing evaluators to more accurately assess use of website features and improve users' navigation across multiple websites.

Although each website is unique, events and webinars pages were by far the most common type of page included on Exchange websites. Publications and research pages, followed by maps and tool pages, were the second and third most common page types. In addition to events and webinars being the most common type of pages, they also were the most commonly viewed (see Figure 33a). Figure 33a displays *Total views* and *Unique views* for the months of (October 2013 to September 2014) for each type of page. Total views are the count of all page views, while unique views only count a user once, regardless of multiple pages re-visits. Distinguishing between the two is particularly important because a small subset of users may be utilizing specific pages multiple times. Although publications and research encompass a diverse swath of materials, these pages did not receive as many unique or total views. The finding that users are still less likely to directly access academic work strengthens the need for Exchanges to continue to translate fire science into more applied forms like webinars and interactive events.

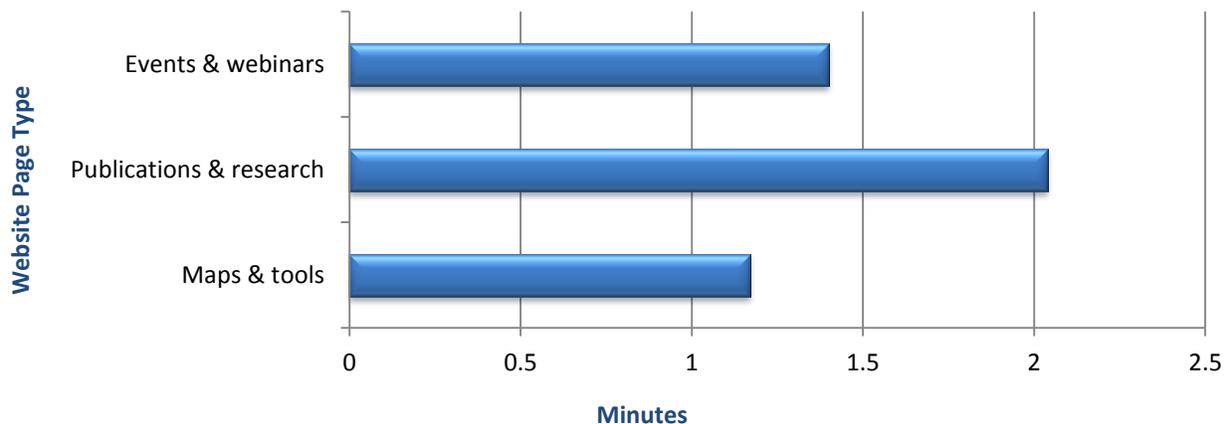
Figure 33a. Aggregated Total Views and Unique Views for Top Website Pages



The duration or time spent on a page indicates viewer engagement. Determining which pages are attracting initial and returning users, as well as the length of time users spend on each page type, can guide Exchanges in either altering websites to provide only the most engaging pages or improve important pages (pages with Exchange priority information) with popular features included on more frequented pages.

Publications and research pages had the longest average duration of time spent, followed by events and webinars, and finally maps and tools (see Figure 33b). This finding makes sense as information on the publication and research pages is likely more complex and would require more time to consume. In light of the above finding that publication and research pages are not being viewed as often as other pages, Exchanges may want to determine if information on these page types could be better organized to help viewers more quickly find and download materials. Implementation of the website template will likely improve organization and viewer searching practices.

Figure 33b. Average Duration in Minutes Spent on Top Website Pages



The finding that users are still less likely to directly access academic work strengthens the need for Exchanges to continue to translate fire science into more applied forms like webinars and interactive events. It is expected that the new website format will increase accessibility of content for users across websites and create more reliable comparisons for establishing best practices.

Qualitative Webmetrics Component

The qualitative webmetrics component was designed to obtain a more comprehensive understanding of Exchange websites' operation and intended purposes. In addition, the qualitative webmetrics component draws on the perspectives of those most responsible for the Exchange websites to help identify best practices and shared challenges. The qualitative component also is intended to complement the quantitative webmetrics component. As consistency in Web analytics data collection and reporting across Exchanges continues to improve, qualitative findings may help provide additional context for quantitative findings and illuminate the *reasons* behind various aspects of website performance.

Qualitative data regarding Exchange websites are collected annually using an online survey completed by Exchange principal investigators and coordinators, webmasters, or other key

Exchange personnel familiar with their Exchange website. Because of the co-occurring website template project, the 2014 survey items were reduced to avoid duplicating questions already being asked of the Exchanges. Data from this outside project provides valuable insight into the current qualitative webmetrics assessment and are referenced when relevant in this section.

Qualitative survey results are first presented for the items pertaining to Exchange websites, followed by those pertaining to Exchange social media accounts. Each section summarizes findings related to maintenance and operation, purpose/target audiences, respondent perspectives, and evaluation activities and plans.

Fire Science Exchange Websites

The current 2014 qualitative webmetrics data (Wave 4) includes responses from 14 JFSP Exchanges with established websites. Although all 14 Exchanges participated in both the 2012 wave (Wave 2) and 2013 wave (Wave 3), several Exchanges were either planning to launch or had newly launched their website. Public launch dates for the Exchange websites ranged from July 2009 to January 2013. The 2014 qualitative webmetrics data provides more comprehensive information regarding Exchange websites' functioning and perspectives on Exchange websites than in prior years. Although all JFSP Exchanges have successfully launched their websites, it is still important to recognize that Exchange websites are in varying developmental stages when interpreting the webmetrics results. In addition, the Exchanges vary in terms of resources and personnel allocated to website development and maintenance.

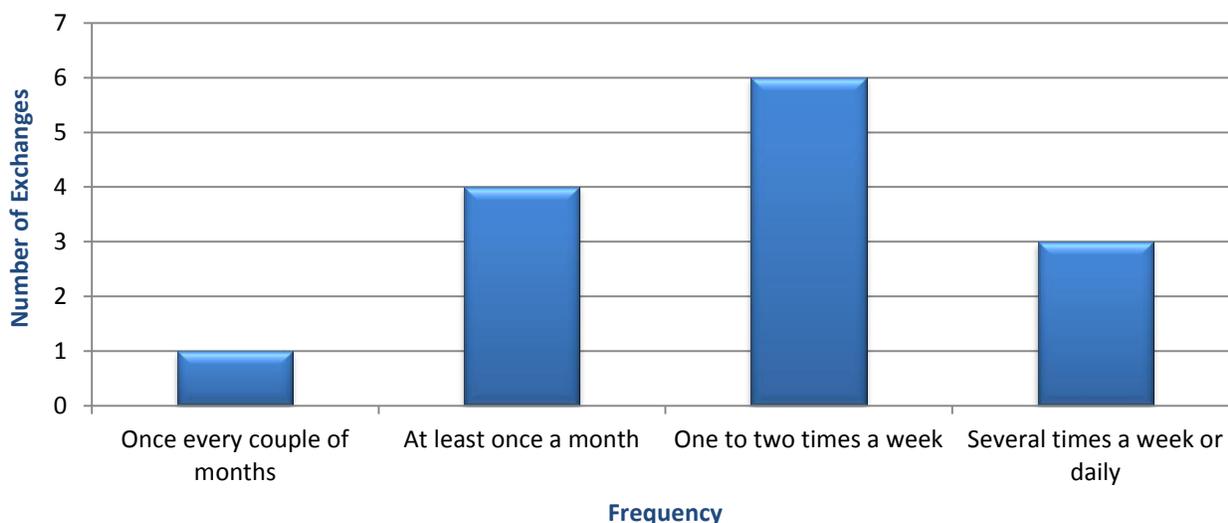
Website Operation and Maintenance

Exchange representatives were asked to respond to a series of questions regarding their time spent on maintaining and updating their website, as well as links to their website (via external websites).

The amount of time spent on website maintenance varied across Exchanges. Overall, the average time spent on website maintenance across all Exchanges was approximately 4 hours a week. The reported time spent overall did not substantially increase or decrease from 2013 to 2014. Four Exchange representatives reported spending one to two hours a week on maintenance. Most ($n = 6$) Exchange representatives reported spending an average of two to six hours a week on maintenance. One Exchange representative said that s/he spent anywhere from two to fifteen hours, depending on Exchange activities throughout the year. Only one Exchange representative indicated that 30 hours per week was spent to maintain their website.

The reported frequency with which Exchange websites were updated was slightly higher in Wave 4 when compared to Wave 3 with more Exchanges updating weekly. Most ($n = 9$) Exchange representatives reported updating websites at least once a week, with two of these Exchanges reporting they update websites daily or several times a day (see Figure 34). Not surprisingly, Exchanges spending more time maintaining their websites also tended to report more frequent website updates.

Figure 34. How Often Websites are Updated



Exchange websites are essential in increasing *awareness* of the JFSP Exchanges’ presence and mission, and the extensive products and learning opportunities they provide. The market for Exchange websites is not yet saturated and employing strategies to attract new website users remains critical to promoting fire science delivery in a variety of target audiences. *Referral*, whereby access to an Exchange website occurs through a link posted on another website, is one means of attracting new users. As indicated in the quantitative webmetrics analysis, only 16 percent of individuals accessing Exchange websites do so through links posted on other sites.

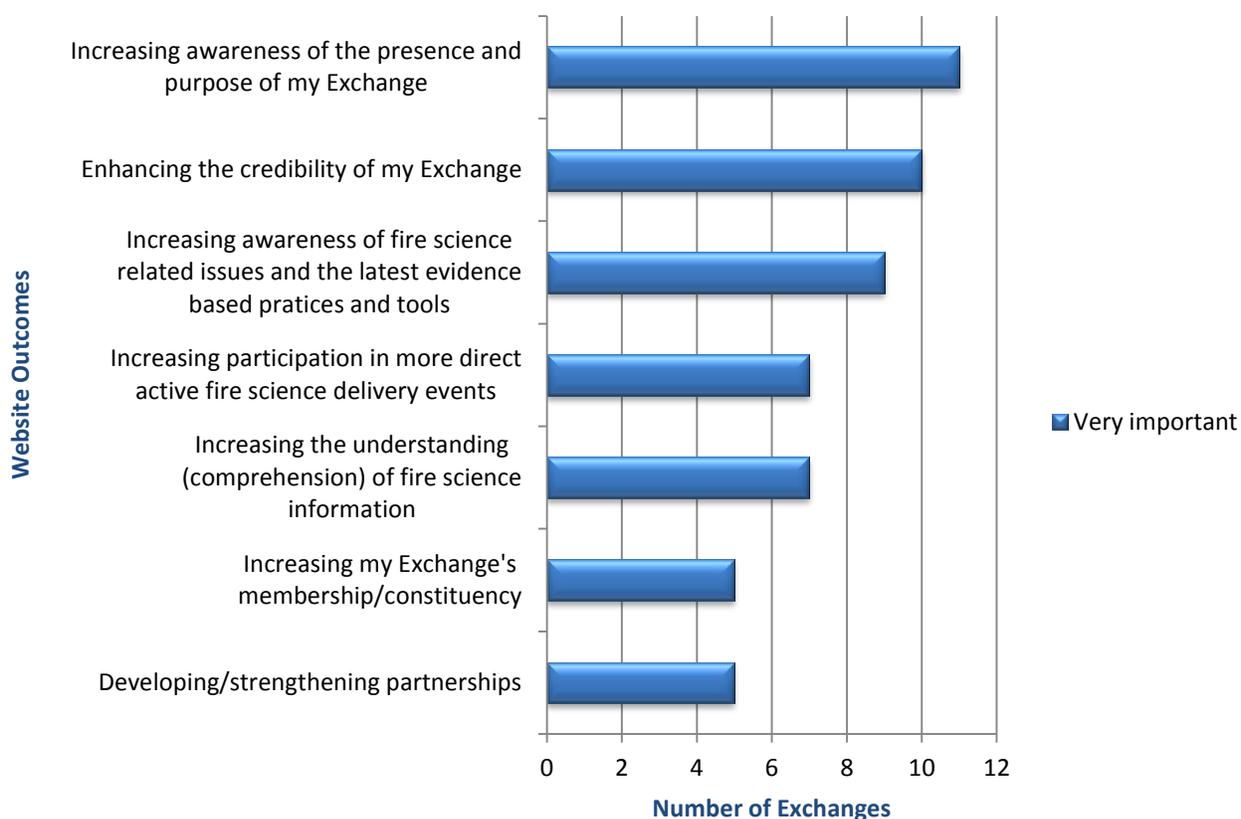
To help determine the extent to which Exchanges are promoting referral traffic, the qualitative webmetrics survey includes an item asking respondents to list the external sites that include links to their Exchange website. In Wave 3, only three respondents could list outside referral sites. New to Wave 4, all Exchange respondents could list at least one external referral site, with 8 Exchanges able to name two or more referral websites. Common types of websites listed included Prescribed Fire council websites, University websites, neighboring Exchange websites, and regional environmental research center websites. Open-ended commentary about Exchange websites obtained as part of the national survey (see page 25 of current report) indicated that additional links to websites related to fire work (such as the weather service or climate change sites) would be helpful additions to Exchange websites. The continuing expansion of referral links is encouraging and Exchanges should continue to pursue reciprocal link sharing with nearby Exchanges as well as other fire science related websites that practitioners also may be using.

Website Goals and Target Audience

Respondents were asked from their perspective to rate a list of statements concerning the goals for their Exchange’s website on a 5 point Likert scale where 1 = *Not important* and 5 = *Very important*. Figure 35 displays frequencies with which Exchange representative describe each statement as a *Very important* outcome or goal for their regional website. Overall, most Exchange representatives responded that their regional website is very important for increasing

awareness of their efforts as an Exchange as well as enhancing the Exchange’s credibility. Perhaps surprising is that only seven Exchanges rated the statement, *Increasing the understanding (comprehension) of fire science information*, as very important given the Exchanges’ primary goal of being a one stop shop for information. Although four additional Exchange representatives did rate this statement as important, perhaps interpretations of the statement differed. It may be that some representatives see their constituents as already very knowledgeable about fire science (therefore the website is increasing *access* to information but not necessarily teaching the basics or how to *comprehend* fire science). This item will need to be modified in the future to clarify the intent of Exchange websites as translators of fire science.

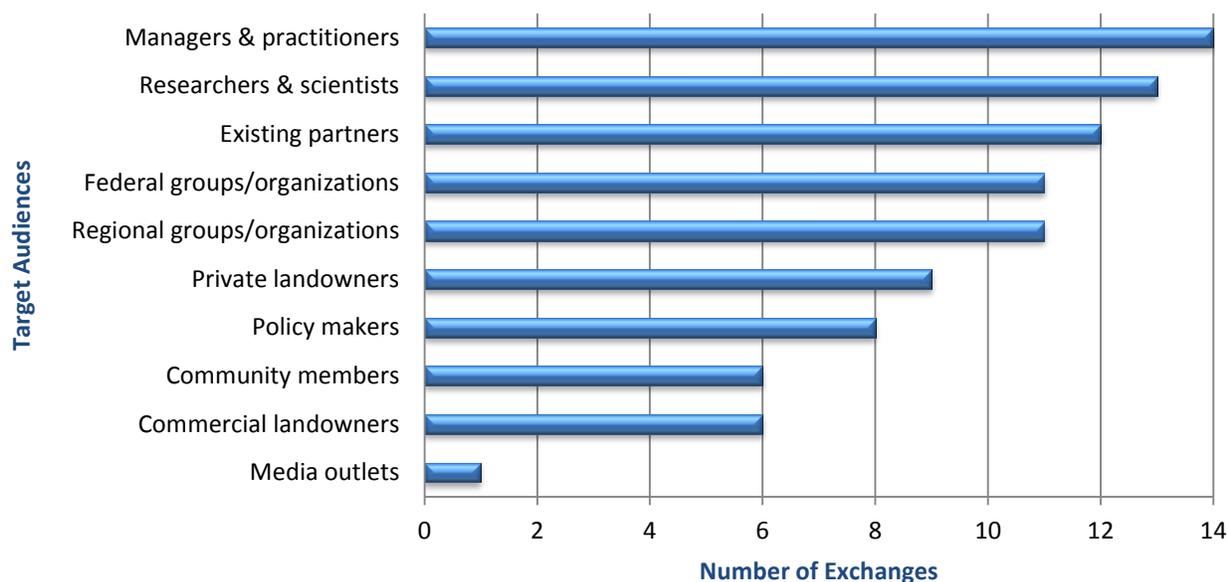
Figure 35. Number of Exchanges Rating the Following Statements as Very Important Goals for their Website



In addition to being asked about goals for Exchange websites, representatives were asked to identify the target audiences of their Exchange website via an item with a “select all that apply” option including an “other” option allowing respondents to list any other target audiences not provided in the response options. Representatives from all Exchanges identified fire managers and practitioners or *Consumers* as the primary target audience for their website. Respondents were then asked to identify any other target audiences for their Exchange website. As shown in Figure 36, all but one Exchange respondent identified fire researchers and scientists as another target audience; additional target audiences of the websites were identified varied across Exchanges. Only one Exchange representative indicated media outlets as a target audience. In

the open response section of the national survey one participant wrote, I “wish the website could be an informational source for the media.” More representatives did state that social media accounts were used to convey Exchange information to media outlets.

Figure 36. Number of Exchanges Identifying Target Audiences for their Website



Perspectives and Opinions about Websites

Exploring the opinions and experiences of those most involved in programming efforts is critical in ensuring the success of any large-scale evaluation, such as the external national evaluation of the JFSP Exchanges. To this end, the qualitative webmetrics survey included items asking Exchange representatives (presumably those most familiar with their Exchange website) for their perspectives on website features as well as website-related challenges. Most of these questions asked for open-ended or text responses.

As previously reported in Wave 3 and also determined by the template creation project, top website features reported by representatives to be most integral to Exchange websites were events and webinar pages. Indeed, the quantitative webmetrics data support that these pages are the most commonly visited by users. Therefore when respondents were asked about the website features that require the most time and effort it is not surprising that events and webinar pages were mentioned. These pages require more time and effort because of their need to be updated frequently on multiple locations throughout the websites. Time and effort to update website content may be seen as the burden of success, as users increase their reliance on Exchange websites for fire science information and interactive opportunities. Once the new template is adopted, however, improvements in website organization and function should ease the time needed to update content.

Next, respondents were asked to briefly describe their single biggest website-related challenge; this challenge could pertain to any aspect or developmental component of Exchange websites. As mentioned above, continued website maintenance and keeping websites updated was a top challenge. An additional challenge stated by respondents was improving website organization. Many respondents stated that organization generally was still a concern and two respondents had specific concerns about the archiving of past materials. Again, the website template creation project was set in motion to address organization and updating concerns and should ease some of these pressures. Respondents in the qualitative survey did express excitement for the upcoming implementation of the website template; however, until implementation actually occurs, the extent of the impact of the template is unknown. As demands for online content increase, Exchanges may want to consider obtaining technical support. Certainly, increasing Exchanges' capacity to maintain online accounts and interpret online data for future improvements will be a necessary focus in the future.

Finally, one respondent mentioned concerns about reaching audiences that speak different languages and audiences with distinct cultures (like tribal communities). As Exchanges hope to effect change across wide and diverse regions, communicating with diverse individuals and communities will be an important consideration. Exchanges may want to focus website evaluations towards how websites can attract and retain diverse audiences that may be integral partners in the future. This may be achieved by seeking interviews with key leaders in target communities to ask about population concerns as they relate to fire and conservation science.

Website Evaluation Plans

The current national evaluation examines JFSP Exchanges' processes and impacts at the aggregate level. Each Exchange, however, is responsible for evaluating their programming impacts at the regional level.⁸ This mandate comes from requirements outlined in the White House Digital Strategy stating that federally funded programs must collect and report data pertaining to their online presence like websites and social media accounts. Exchanges' evaluations of their individual websites may provide valuable information that cannot be captured at the aggregate level. Regional evaluations can enhance the understanding of specific user needs, as well as website strengths and areas for improvement with respect to organization and content. Exchanges wishing to evaluate their websites may do so through several different means, such as conducting focus groups, interviewing current and potential website users, and/or including a brief "pop-up" evaluation survey on their actual website.

When asked if the Exchange had conducted a regional scale evaluation of their website, the majority of respondents answered *No* ($n = 10$). The four Exchanges that conducted an evaluation used interviews, surveys (online and paper), and focus groups. In brief statements about the outcomes of these evaluations, respondents stated that the evaluation provided useful information about website issues they had or were working on improving. Respondents also indicated that they were excited to receive feedback from the template creation project to help improve their websites. When asked if there were plans to conduct a regional evaluation,

⁸ The JFSP Consortia Evaluation Resource Guide (2011) provides tools and references to assist Exchanges in evaluating their regional educational and outreach activities. To request a copy of this guide, please email Lorie Sicafuse at lsicafuse@unr.edu.

many respondents skipped the question and only four respondents answered with intentions to conduct a regional evaluation in the future. One respondent indicated an evaluation after the implementation of the new website template would be conducted. Other Exchanges may want to take this approach as well, as examining website functioning after implementation of the website template can highlight how the template is serving the specific needs of the region. The Exchanges intending to conduct a regional evaluation largely thought they would utilize a survey method ($n = 3$), and one Exchange thought they would use qualitative interviews. Exchanges may want to refer back to the JFSP Consortia Evaluation Resource Guide (2011) to find tools and references for choosing and implementing an evaluation method.

When respondents were asked about barriers to conducting regional evaluations, two major themes emerged: 1) not enough time and 2) low response rate or survey fatigue.

Not enough time. Some respondents indicated they were already pressed for time with maintaining the website and social media accounts, or evaluating other Exchange activities, that website evaluation was not feasible. However, one respondent indicated that his/her Exchange had worked around this issue by adding regional questions to the national survey, asking input about the website from their advisory board, or simply asking for informal feedback in face-to-face meetings or at events. These strategies may work for Exchanges not interested in conducting a formal regional evaluation. In addition, the evaluation team can forward Exchange-specific national survey data immediately after the national survey closes (this data would come as a PDF of frequencies downloaded from SurveyMonkey). Receiving Exchange specific data from the national survey, although not a substitute for a regional evaluation, may be an efficient method of identifying regional issues or progress. The Google Analytics or webmetrics data already being collected provides an opportunity for the Exchanges to better understand website users' behavior such as page/content preferences, navigation and engagement. The national evaluation team also can answer any questions Exchanges may have about an evaluation plan they intend to implement. Finally, the website template implementation will improve website time allocation as it attempts to organize and streamline the websites maintenance process.

Low response rate or survey fatigue. Another issue indicated by respondents was low response rate. Some respondents expressed disappointment in the number of individuals who actually participated when conducting their evaluation. Response rate is always an issue when conducting any evaluation. One

“Like most of us, a low response rate is always an issue. This time we plan on using all our social media outlets to conduct the evaluation; including listserves, Facebook and Twitter.”

-Qualitative Survey Respondent

primary way Exchanges can help alleviate this issue is to grow their listserves. Specifically, continually working to expand the number of individuals on the Exchange listserves will help ensure that Exchanges have a large enough pool with fresh participants to draw from when recruiting for an evaluation. Exchanges are encouraged to find creative ways to engage participants that are specific for regional or participant needs. Exchanges may think about conducting focus groups or interviews during or after events that are already scheduled.

Utilizing brief pop-up surveys on the website to ask about functioning or user needs while participants are visiting should yield higher response rates. Another suggestion may be personalizing the study by clearly stating how the findings will result in meaningful change for participants, using participants' names in all communication, or referencing how the participant was referred to the evaluation by a friend or colleague. Thank you cards may add to a personalized touch, encouraging future participation, if the same participant pool will be tapped again in the future. Finally, Exchanges may want to avoid survey fatigue by sticking to the JFSP schedule for the national survey (every other year) as well as considering other means beyond surveys to conduct evaluations (examples include focus groups and interviews conducted via phone or in-person). Again, the national evaluation team can answer any questions Exchanges may have about an evaluation plan they intend to implement.

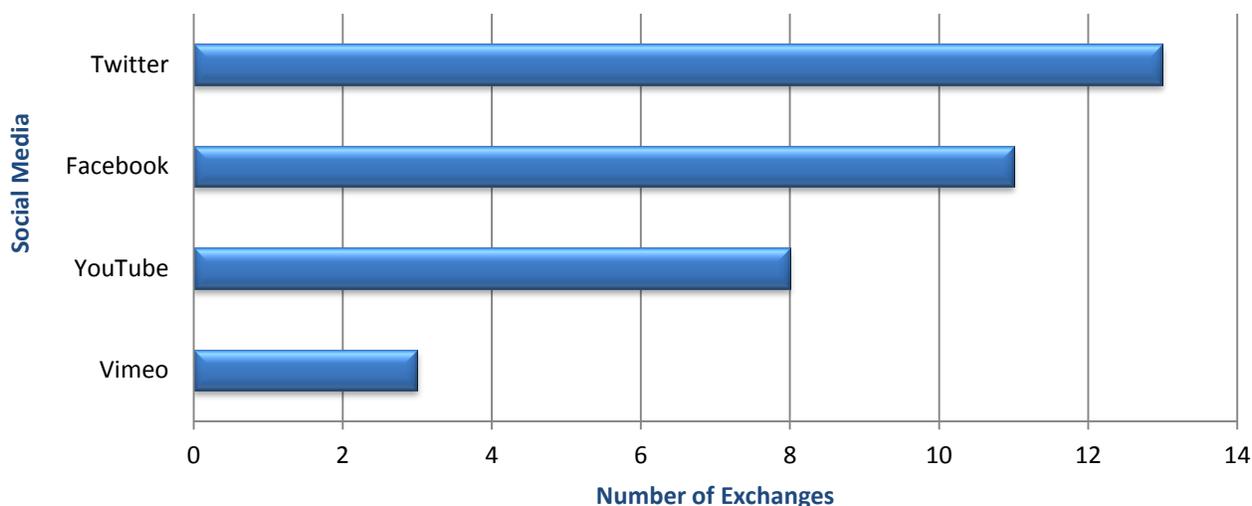
Social Media

The goal of social media usage by Exchanges is to increase awareness of Exchanges as well as drive traffic to Exchange events and products. Social media items on the qualitative survey were used to obtain a basic understanding of Exchanges' efforts expended on social media accounts, social media target audiences, and Exchange representatives' perspectives on the value of maintaining social media accounts.

Operation of Fire Science Exchange Social Media Accounts

As of Wave 4, most Exchanges were operating social media accounts (see Figure 37). The majority of respondents ($n = 13$) reported that their Exchange had an established Twitter account. Over three quarters ($n = 11$) reported that their Exchange had an active Facebook account, with one additional respondent reporting plans to establish a Facebook account in the near future. Eight respondents reported that their Exchange had a YouTube account, with two additional respondents indicating plans to establish an account in the near future. Other social media sites that Exchanges utilize included Tumblr, LinkedIn, and Reddit. The expansion of social media use among Exchanges is encouraging. Exchanges should continue to link across social media accounts and link social media accounts with Exchange websites to promote fire science delivery and Exchange awareness.

Figure 37. Number of Exchanges with Social Media Accounts



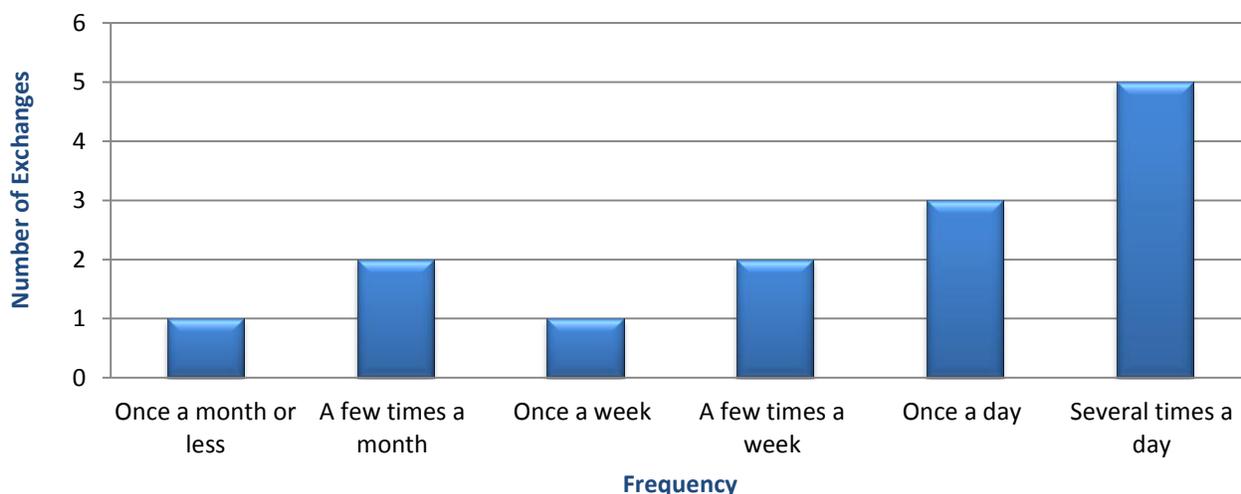
Respondents were asked to identify the primary person maintaining their Exchange’s social media accounts. The majority ($n = 9$) said that the Coordinator was the primary and sole individual responsible for their Exchange’s social media accounts. Three respondents indicated that the responsibility for the Exchange social media accounts was shared between the coordinator and another individual (such as student volunteer or contracted staff). Two respondents indicated that social media accounts were managed by a dedicated individual hired for the express purpose of managing these accounts. An increase in technical support was seen from Wave 3 to Wave 4. Exchanges should continue to consider ways to support coordinators as they manage expanding social media and website demands.

When asked about which social media account took the most time to update, most respondents stated Twitter ($n = 8$), one respondent stated Facebook, three stated Twitter and Facebook equally. Respondents indicated that the content of posts as well as the amount of posting to these sites was challenging as there was felt pressure to be constantly creative and engaging. Exchanges may want to allocate a single day to preplan some posts ahead of time that can be spread out over the month, remaining flexible to posting content specific to current events. Peppering posts with new and preplanned content may take some pressure off of being creative every day for every post. In addition, Exchanges may want to reach out to each other or other organizations in the twittersphere to help highlight what information is trending to inform posts, shares, or retweets.

In addition, respondents were asked how many hours a week were spent updating social media accounts. The majority of respondents ($n = 9$) reported that three or less hours were devoted to social media account updates a week. One respondent indicated that three to seven hours were spent a week updating social media accounts. The remaining three respondents indicated five to six hours were spent a week updating social media accounts. This is a substantial amount of time to dedicate to Exchange social media accounts considering: 1) the relatively recent advancement of JFSP Board recommendations that all Exchanges establish social media accounts and 2) the time required to post, re-tweet or otherwise update social media accounts.

Over half of Exchange representatives said that their Exchange’s social media account was updated on at least a daily basis ($n = 8$), with five reporting that their account was updated several times a day (see Figure 38).

Figure 38. How Often Social Media Accounts are Updated

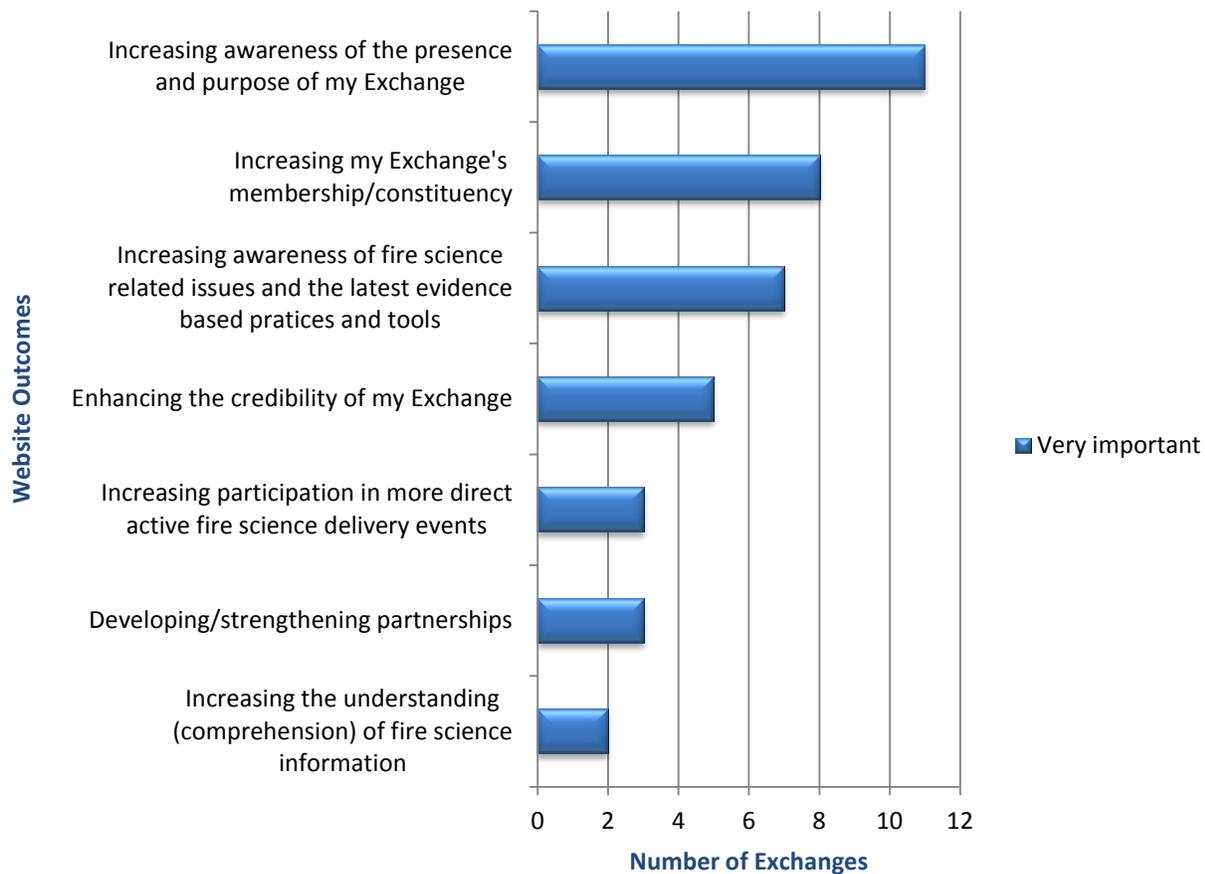


Respondents also were asked if their Exchange social media accounts were integrated or linked to their website via a social media management tool such as HootSuite or another mechanism. Establishing such cross-linkages is important, as these linkages can help draw Exchange social media followers to Exchange websites and vice versa. For instance, Exchange websites may incorporate their Exchange’s Twitter feed, or the Exchange’s Twitter feed may include links directing users to their website. One third of respondents ($n = 5$) indicated that their Exchange websites and social media accounts were linked in this manner, with three reporting that such links had not been established but that there were plans to do so in the near future.

Social Media Goals and Target Audiences

Respondents were asked from their perspective to rate a list of statements concerning the goals for their Exchange’s social media accounts on a 5 point Likert scale where 1 = *Not important* and 5 = *Very important*. Figure 39 displays frequencies of Exchange representative describing each statement as a *Very important* outcome for their social media accounts. When compared to ratings for Exchange websites, there was less agreement that social media accounts were very important for fulfilling the listed goals. *Increasing awareness of the presence and purpose of my Exchange* was again rated as very important to most Exchanges ($n = 11$) as a goal for social media accounts. However, social media accounts were seen as more important for increasing the membership or constituency of Exchanges than were websites. This finding makes sense as social media accounts can potentially be more interactive than websites. Social media sites may serve to reach out to diverse audiences, bringing them to Exchange activities and hopefully onto Exchange websites. One respondent also stated that posts or tweets were a two-way street and that Exchanges could obtain valuable information from constituents as well as communicate information.

Figure 39. Number of Exchanges Rating the Following Statements as Very Important Goals for Social Media Accounts



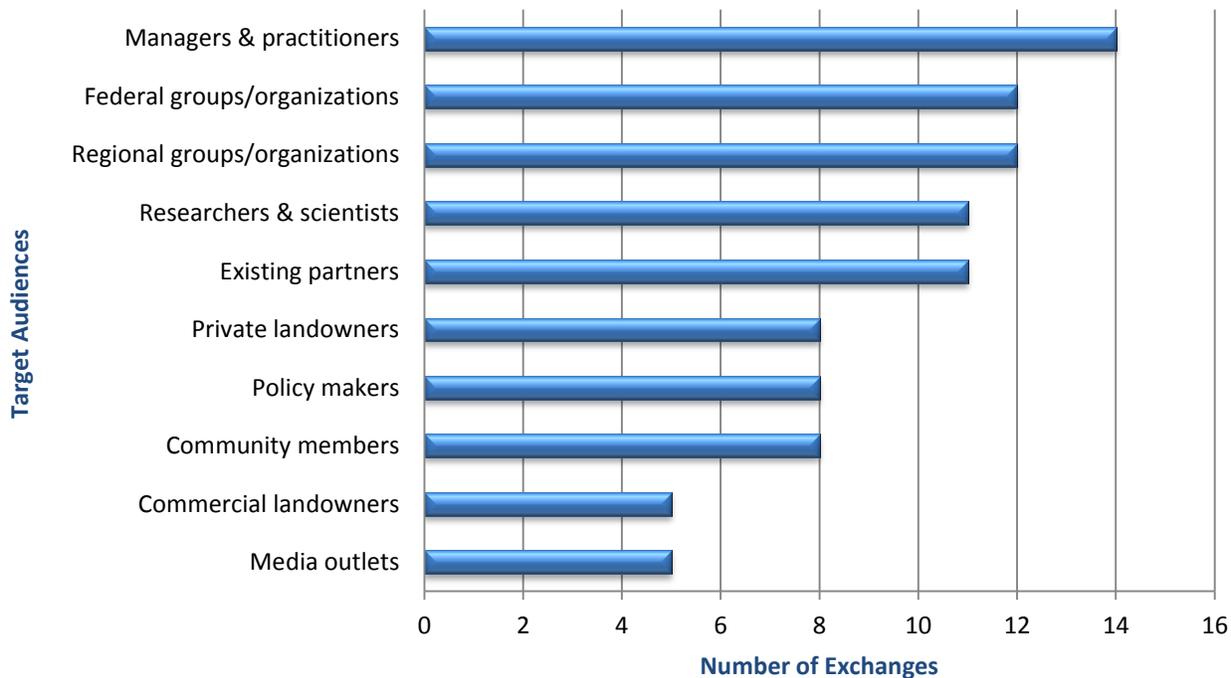
“My view is that social media tools are important as a two-way street - we are not just using Facebook and Twitter to broadcast information but also to scan what's happening in the land management and research communities. Social media helps us stay in touch across a 12-state region!”

-Qualitative Survey Respondent

Respondents were asked to identify the target audiences of their Exchange social media accounts via an item with a “select all that apply” option including an “other” option allowing respondents to list any other target audiences not provided in the response options. Results suggest that Exchanges’ target audiences for their social media accounts are broader than the target audiences for their websites. All Exchange representatives indicated that fire *Managers & practitioners* were target audiences for their Exchange social media accounts (see Figure 29). Twelve Exchange representatives also identified *Federal and Regional organizations/groups* and *Regional groups/organizations* as target audiences. Only eleven respondents indicated that fire *Researchers & scientists* were target audiences for social media. One respondent commented

that different social media accounts were used for different audiences; specifically, Facebook followers tended to be land managers whereas Twitter followers tended to be academics. Different social media accounts for different target audiences may be strategically utilized by Exchanges to plan content as well as target awareness of their purpose and activities. Social media accounts were rated by more Exchanges as very important to reaching community and media outlets than were websites.

Figure 40. Number of Exchanges Identifying Target Audiences for Social Media



Perspectives and Opinions about Social Media

Exchange representatives were asked to discuss challenges related to maintaining social media accounts. Besides pressures concerning having to constantly create engaging posts mentioned above, other challenges included the amount of time allocated to maintenance, appropriateness of social media for reaching the fire science community, and determining if effort spent was worthwhile. As Exchanges continue to expand types of social media accounts they use, the time it takes to maintain these accounts will continue to be a consideration. Again, linking accounts (via tools like HootSuite or Crowdbooster) or planning posts ahead of schedule may help with reducing maintenance time. However, it is likely that as online use expands as a primary resource, technical demands will be an ever present concern.

“I have a bit of difficulty coming up with catchy things to do on social media. Wish I were better and quicker with coming up with lively bits to mention on social media.”

-Qualitative Survey Respondent

In addition, some respondents stated concerns that the fire science community may not be social media users due to age or familiarity with this technology. Although it is unknown to what extent this concern is present in the community, the use of social media is only likely to increase in the future. Exchanges may want to conduct

“Making the time to effectively search and include all possible relevant followers and partners. We know there are new and innovative ways of searching, tracking, and interpreting analytics and social media data. It would be helpful to have some guidance to interpret how effective our social media methods are and what we can do to improve.”

-Qualitative Survey Respondent

a regional evaluation concerning how their constituents are using social media as well as if there is a desire to learn more about social media if the audience is indeed unfamiliar with the medium. Again, different social media platforms are likely to appeal to different audiences, and Exchanges should utilize different platforms to maximize their reach.

Finally, some respondents stated that they were unsure of how to track whether social media was leading to meaningful use among members. See section below for further discussion.

Social Media Metrics: Collection and Analysis

The JFSP Board recommended that all Exchanges develop and implement a means of tracking the extent to which social media accounts are reaching targeted audiences. Furthermore, new requirements outlined in the White House Digital Strategy mandate that federally funded programs collect and report data pertaining to their use of social media accounts. Therefore, respondents were asked if their Exchange was currently collecting quantitative data regarding their social media accounts. More than half ($n = 10$) of Exchange representatives indicated that they were collecting quantitative social media data. When asked about social media challenges, however, some Exchange representatives expressed concerns that they were still unsure how to interpret the quantitative data and thus the implications of their social media work. One Exchange stated they were using Crowdbooster, an online tool that helps organizations track their audiences on many social media platforms. A tool like Crowdbooster may help other Exchanges looking for user-friendly interpretations of quantitative data as well as recommendations for posts. In addition, social media accounts should be driving audiences to Exchange events, products/tools and onto Exchange websites. Brief questions at events or on pop-up website surveys regarding how participants were directed to the Exchange can help answer whether social media is translating to Exchange participation. Given that social media outlets are valuable venues for interacting with and acquiring new audiences, future efforts should be directed towards helping Exchanges build their social media capacity. Learning to utilize and further improve social media accounts will help Exchanges remain relevant in the future.

Webmetrics Component: Summary and Future Directions

The 2014 webmetrics data is the most comprehensive to date, with 14 Exchanges represented in the quantitative and qualitative components. The Wave 4 webmetrics data illuminated the current functioning of Exchange sites, common challenges encountered and potential areas for improvement.

The quantitative webmetrics component was able to highlight valuable trends across all Exchange websites. When mean session and user data for Exchange websites was first tracked in Wave 1 and Wave 2, patterns of usage were highly erratic. In Wave 3, those usage patterns began to stabilize across the year. Now in Wave 4, this stabilizing pattern has continued and suggests that utilization is occurring more regularly year round with slight increases in the winter months and slight decreases in the summer months. Data suggest that Exchange websites have a core audience of regular users that visit websites on average three to eight times a month. In Wave 4, however, the month of April had the highest number of single visit users. Although the data do not illuminate the *why* behind this pattern, Exchanges may want to investigate co-occurring activities in April that may have been responsible for this jump in website visits and utilize that information to attract and retain users in the future.

Encouragingly, Wave 4 saw an increase in *Organic* searches, meaning that visitors were more likely to come to Exchange websites from search engines. The use of search engines to navigate to Exchange websites implies outreach to new audiences. In addition, questions concerning referrals to websites occurred in the national survey, as well as the webmetrics quantitative and qualitative components. Combined these data suggested that Exchange websites should reach out to fire science related websites used by Consumers (like climate change sites) to share links. The expansion of referral links is not only helpful for users of Exchange websites but also may increase the reach of the Exchanges.

The quantitative webmetrics component also found that the pages most likely to be visited by users were events and webinar pages, followed by maps and tool pages. The popularity of these pages over publication and research pages may highlight the importance of Exchanges as *translators* of fire science information. Although publication and research pages are important resources, Exchanges can capitalize on their ability to make research findings more applicable for diverse audiences through interactive events, webinars, and tools.

The qualitative webmetrics component was able to expand understanding of the intended purpose and current experiences with Exchange websites and social media accounts from the individuals most responsible for these platforms. Overall, there was much anticipation for the new website template as it should improve website organization and maintenance time. One representative stated that an evaluation of the website would occur after implementation of the template. All Exchanges implementing the website template should consider conducting a post evaluation to discover the extent of improvements for website users as well as if there are unaddressed specific regional needs. The evaluation could take the form of pop-up surveys on the website, or interviews or focus groups around already scheduled Exchange events to increase participation and reduce time taken to conduct an evaluation.

Participants in the 2014 qualitative survey also were asked about their social media accounts. More than half of the representatives ($n = 8$) stated that they updated their social media accounts at least once a day and most ($n = 11$) were operating accounts on more than one platform. Because of the amount of posting to social media accounts, many respondents reported challenges like burdens on time and increased pressure to be constantly creative and engaging in posts. One representative, however, did highlight how social media could be a two-way street of communication to both impart information as well as receive feedback about interests from the fire science community in their region.

When asked about other challenges related to social media accounts, some respondents indicated that they were unsure how to interpret data from their social media accounts to make changes to utilize this resource to its fullest. In addition, a couple of representatives stated that social media may not even be relevant to fire science community members. Building Exchanges' capacity to track and interpret social media data will help Exchanges feel that the time invested in social media markets is forwarding the purpose of the Exchanges; specifically, connecting how time spent on social media is translating into audience reach and engagement. Online platforms likely will continue to increase as mechanisms for information exchange. Exchanges may want to budget for and contract outside social media assistance to help collect and analyze data; this will not only help with making improvements in social media usage to better connect and attract users but also will help Exchanges adhere to the White House Digital Strategy requirements. In addition, Exchanges should seek guidance from one another and implement shared strategies for social media success.

Limitations

As with any evaluation project, the national cluster evaluation of the JFSP Exchange Network has limitations that should be noted. First, Exchanges themselves differ greatly on timing of their start dates, development, size, as well as regional environmental and political considerations. Therefore, the uniqueness and individual growth of each Exchange may confound data interpretation within and across waves. In addition, when Exchanges have participated in the national survey, some Exchanges have recruited more survey participants than other Exchanges; thus, some Exchanges are overrepresented in the data. An example of overrepresentation in the data can be seen in the General Public frame as some Exchanges make the General Public a target audience and thus have more General Public respondents. The three survey frames themselves also have different sample sizes that can be problematic for comparisons. For example, although the Producer and Consumer frames share related questions, fewer numbers of Producer respondents means that fewer responses are necessary to create a majority response; thus caution is required when directly comparing results across frames. Finally, every year the national survey taps the same participant pools, meaning that each wave of the survey may have the same repeating participants. Repeating participants are not a problem per se, but it should be noted that our final yearly samples likely represent a mix of repeating and new respondents. Again, all Exchanges should strive to expand their listserves so that each wave of the national survey has a diverse and representative sample of participants that reflect the each Exchange's continuing fluctuation in stakeholders and constituents.

References

- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method*. New York: Wiley.
- Sicafuse, L., Evans, W., & Singletary, L. (January 2013). *Joint Fire Science Program regional consortia 2012 evaluation report: A national cluster evaluation of consortia process and impacts*. [available from the authors]
- Sicafuse, L., Evans, W., Singletary, L., & Maletsky, L. (July 2013). *Interviews with JFSP consortia leadership and staff*. [available from the authors]
- Sicafuse, L., Singletary, L., & Evans, W. (January 2012). *A cluster evaluation of the process and impacts of the Joint Fire Science Program regional consortia: Initial survey and webmetrics report 2010-2011*. [available from the authors]
- Singletary, L., Evans, W., & Sicafuse, L. (September 2011). *Evaluation resource guide for JFSP consortia*. [available from the authors]